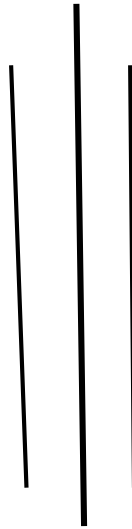


A study on
“The Analysis on the Investment in Shares of
Joint Venture Banks”



Submitted By:

Archana Upadhyay

St. Xavier's Campus

T.U. Registration No: 7-2-282-372-2002

Exam Roll No: 6538

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**Tribhuvan University
Faculty of Management Studies
St. Xavier's Campus**

Declaration

I hereby declare that the worked reported in this thesis entitled **A Study on “The Analysis on the Investment in Shares of Joint Venture Banks”** submitted to St. Xavier's Campus, Faculty of Management, Tribhuvan University is my original work done in the form of partial fulfillment for the requirement of Master's Degree in Business Studies (MBS) under the supervision of respected Mr. Shankar Thapa.

Researcher
ARCHANA UPADHYAY
St. Xavier's Campus
T.U. Registration No: 7-2-282-372-2002
Exam Roll No: 6538

Date:.....

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I hope the possible errors would be covered by the subsequent studies in this field in the future.

Researcher
ARCHANA UPADHYAY
St. Xavier’s Campus
T.U. Registration No: 7-2-282-372-2002
Exam Roll No: 6538

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Abbreviation

AD	after death
Ltd	limited
No	number
NEPSE	Nepal Stock Exchange
JVB	Joint Venture Banks
CAPM	Capital Asset Pricing Theory
APT	Arbitrage Pricing Theory
NABIL	Nepal Arab Bank Limited
SCBNL	Standard Chartered Bank Limited
HBL	Himalayan Bank Limited
Nepal SBI	Nepal State Bank of India
NBBL	Nepal Bangladesh Bank Limited
EBL	Everest Bank Limited
S.N	Serial Number
FY	Fiscal Year
Rs.	Rupees

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

A bank is an institution which deals in money, receiving it on deposit from customers, honoring customer's drawing against such deposit on demand, collecting cheques for customers and lending or investing surplus deposits until they are required for payment. In the present days, various types of banks are established, for instance, industrial bank, commercial bank, agricultural bank, joint stock bank, co-operative bank and development bank. These banks help the financial market to facilitate the flow of fund from surplus to deficit units.

Meaning of Bank

According to The Concise Oxford Dictionary, "Bank is a financial establishment which uses money deposited by customers for investment, pays it out when required, makes loan at interest, exchanges currency, etc"

"A person or company carrying on the business of receiving money and collecting draft for customer subject to the obligation of honoring cheques drawn upon them from time to time by customer to the extent of the amount available on their current account."

(Hart, 1931:1)

"A banker is defined as an individual, partnership or corporation, whose sole or predominating business is banking, that is, the receipt of money on current or deposit account, and the payment of cheques paid in by a customer." (Halsbury's Laws of England)

1.2 Evolution of Banking Industry

The evolution of banking industry has started a long time back, during ancient times. There was reference to the activities of money changers in the temple of Jerusalem in the New Testament. In ancient Greece the famous temples of Delphi and Olympia served as the great depositories for people's surplus funds and these were the centers of money lending transaction. Indeed the traces of "rudimentary banking" were found in the Chaldean, Egyptian and Phoenician history. Banking suffered oblivion after the fall of the Roman Empire after the death of Emperor Justinian in 565 A.D., and it was not until the revival of trade and commerce in the middle ages that the lesson of finance were learnt anew from the beginning. Money lending in the middle ages was, however, largely confined to the Jews since the Christian were forbidden by the cannon law to the sinful act of lending money to others on interest.

As a public enterprise, banking made its first beginning around the middle of the twelfth century in Italy and the bank of Venice, founded in 1157 was the first public banking institution. Following it were established the Bank of Barcelona and the Bank of Genoa in 1401 and 1407 respectively. The Bank of Venice and the Bank of Genoa continued to operate until the 18th century. With the expansion of commercial activities in Northern Europe there sprang up a number of private banking housed in Europe and slowly it spread throughout the world.

1.3 Growth of Banking Sector in Nepal

In Nepal, the development of banking is relatively recent. In Nepalese chronicle, it was recorded that the new era known as Nepal Sambat was introduced by Shakhadhar, a

Sudra merchant of Kantipur in 879 AD after having paid all the outstanding debts in the country. This shows the basic of money lending practice in ancient Nepal towards the end of the 8th century, Gunkam Dev had borrowed money to rebuild the Kathmandu valley.

The establishment of the Tejarath Adda during the year 1877 AD was the starting of modern financial system in Nepal. In the year 1934 AD, the establishment of Nepal Bank Ltd came into existence under “Nepal Bank Act, 1937” as the first commercial bank of Nepal. Rastriya Banijya Bank was the second commercial bank established in 1965.

In the long run, commercial bank act was felt, accordingly it was established in 1974AD. According to section 2(a) of Commercial Bank Act 1974, the commercial banks are the heart of the economic system. They hold the deposits of million of persons, government and business units, it exchanges money, accepts deposits, grants loan and operates commercial transaction. They make funds available through their lending and investing activities to borrowers, individual, business firm and government.

A list of all commercial banks with their respective establishment date and head office location are mentioned in the next page.

Table no: 1.1

List of Licensed Commercial Bank

Mid-January 2008

Serial no	Commercial Banks	Established Date(B.S)	Head Office
1	Nepal Bank Ltd	1937/11/15	Kathmandu
2	Rastriya Banijya Bank Ltd	1966/01/23	Kathmandu
3	NABIL Bank Ltd	1984/07/16	Kathmandu
4	Nepal Investment Bank Ltd	1986/02/27	Kathmandu
5	Standard Chartered Bank Nepal Ltd	1987/01/30	Kathmandu
6	Himalayan Bank Ltd	1993/01/18	Kathmandu
7	Nepal SBI Bank Ltd	1993/07/07	Kathmandu
8	Nepal Bangladesh Bank Ltd	1993/06/05	Kathmandu
9	Everest Bank Ltd	1994/10/18	Kathmandu
10	Bank of Kathmandu Ltd	1995/03/12	Kathmandu
11	Nepal Credit and Commerce Bank Ltd	1996/10/14	Rupandahe
12	Lumbini Bank Ltd	1998/07/17	Chitawan
13	Nepal Industrial and Commercial Bank Ltd	1998/07/21	Biratnagar
14	Machhapuchhre Bank Ltd	2000/10/03	Pokhara
15	Kumari Bank Ltd	2001/04/03	Kathmandu
16	Laxmi Bank Ltd	2002/04/03	Kathmandu
17	Siddhartha Bank Ltd	2002/12/24	Kathmandu
18	Agriculture Development Bank Ltd	2006/03/16	Kathmandu
19	Citizens Bank International Ltd.	2007/06/21	Kathmandu
20	Global Bank Ltd.	2007/01/02	Birgunj
21	Prime Commercial Bank Ltd.	2007/09/24	Kathmandu
22	Sun Rise Bank Ltd.	2007/10/12	Kathmandu
23	Bank of Asia Ltd.	2007/10/12	Kathmandu

Source: NRB, Banking and Financial Statistics, 2008

Out of these banks these following are the joint venture banks

S. N	Name of Bank	Foreign investing party
1	Nepal Arab Bank Ltd (NABIL)	National Bank Ltd, Bangladesh
2	Standard Chartered Bank Nepal Ltd (SCBNL)	Standard Chartered Group
3	Himalayan Bank Ltd (HBL)	Habib Bank Ltd of Pakistan
4	Nepal SBI Ltd	State Bank of India
5	Nepal Bangladesh Bank Ltd (NBBL)	
6	Everest Bank Ltd (EBL)	Punjab National Bank

1.4 Security Market in Nepal

Introduction

The history of securities market began with the floatation of shares by Biratnagar Jute Mills Ltd and Nepal Bank Ltd in 1937. Introduction of the Company Act in 1964, the first issue of Government Bond in 1964 and the establishment of Securities Exchange Center Ltd. in 1976 was other significant development resulting to capital markets.

Securities Exchange Center was established with an objective of facilitating and promoting the growth of capital markets. Before the conversion into stock exchange, it was only the capital market institution undertaking the job of brokering, undertaking, managing public issue, market making for government bonds and other financial services.

His Majesty's Government, under a programme initiated to reform capital market, converted Securities Exchange Center into Nepal Stock Exchange in 1993.

Nepal Stock Exchange, in short, NEPSE, is a non-profit organization, operating under Securities Exchange Act, 1983.

The basic objectives of NEPSE is to impart free marketability and liquidity to the government and corporate securities by facilitating transactions in its trading floor through market intermediaries such as broker, market makers etc.

NEPSE opened its trading floor on 13th January 1994 through licensed members.

His Majesty's Government, Nepal Rastra Bank, Nepal Industrial Development Corporation and Members are the shareholders of the NEPSE.

Trading System

NEPSE, the only Stock Exchange in Nepal, introduced fully automated screen based trading since 24th August, 2007. The NEPSE trading system is called 'NEPSE Automated Trading System' (NATS) is a fully automated screen based trading system, which adopts the principle of an order driven market.

NEPSE operates on the 'NEPSE Automated Trading System' (NATS), a fully screen based automated trading system, which adopts the principle of an order driven market.

Market Timings

Trading on equities takes place on all days of week (except Saturdays and holidays declared by exchange in advance). On Friday only odd lot trading is done.

The market timings of the equities are:-

Market Open: - 12:00 Hours

Market Close: - 15:00 Hours

Odd Lot Trading is done on Fridays. For Odd Lot Trading Market Timings are

Market Open: - 12:00 Hours

Market Close: - 13:00 Hours

Securities Available for Trading

NEPSE facilitates trading in the following instruments

A. Shares

- Equity Shares
- Preference Shares

B. Debentures

C. Government Bonds

D. Mutual Funds

1.5 Portfolio Analysis

A portfolio is a combination of investment assets. The portfolio is the holding of securities and investment in financial assets i.e. bond, stock etc. Portfolio management is related to the efficient portfolio investment in financial assets.

The portfolio analysis is performed to develop a portfolio that has the maximum return at whatever level of risk an investor thinks appropriate. If portfolio is being constructed they can reduce unsystematic risk without losing considerable return; therefore, we need to extend our analysis of risk and return to portfolio context.

According to Western and Brigham “A portfolio simply represents the practice among the investors of having their funds in more than one asset. The combination of investment asset is called a portfolio.” (Weston & Brigham, 1982:245)

Why portfolio?

“You will recall that expected return from individual securities carries some degree of risk. Risk was defined as the standard deviation around the expected return in effect we

equated a security's risk with the variability of its return. More dispersion or variability about a security's expected return meant the security was riskier than one with the less dispersion.

The simple fact that securities carry differing degrees of expected risk leads most investors to the notion of holding more than one security at a time, in an attempt to spread risks by not putting all their eggs into one basket. Diversification of one's holding is intended to reduce risk in an economy in which every asset's returns are subject to some degree of uncertainty. Even the value of cash suffers from the inroads of inflation. Most investors hope that if they hold several assets, even if one goes bad, the others will provide some protection from an extreme loss." (Fischer & Jordan, 2000:560)

1.6 Statement of the Problem

People assume more risk in stock investment than its real risk. So, it is necessary to analyze in this field. Unavailability of clear and simple technique to analyze risk associated with return is also a constraint.

Theory depicts that the stock price in market is guided by the intrinsic value, which is calculated by company's required rate of return and growth. In an efficient market conditions, stock price is equal to the intrinsic value since the buyer and seller are fully aware of the facts and figures of the company. Therefore, one can say that market price and financial performance are positively correlated but conditions here are totally different from that. Whatever the theory depicted is not applicable in our context, where most of the investor does not know how to interpret to information and they can make an irrational decision, regarding transaction of the stock. Therefore stock prices in Nepal is

determined more by other factors than their financial performance and investor feel more risk in stock investment than actual real risk.

Above all, the following research problem are identified

1. How the investment decisions are to be taken?
2. Does the risk and return of JVB vary significantly?
3. What are the comparative risk positions of JVB
4. What are the factors affecting riskiness of the securities.
5. To what extent there is systematic risk in relation to total risk
6. Would portfolio construction within the JVB be profitable
7. How can investors diversify the risk within commercial banks?

1.7 Objective of the Study

Nepalese investors are facing various above mentioned problems in setting their instrument policies, evaluating financial assets, constructing portfolio and revising and analyzing their portfolio performance. The key objective of the study revolve around the subject of finding out risk minimizing tools and techniques in relation to certain financial as well as other constraints., the main and basic objectives of this study is to estimate an optimal portfolio among investment in shares of commercial bank. However other objectives are as follows:

-) To evaluate common stock of JV banks in terms of risk and return and to perform sector wise comparison on the basis of market capitalization
-) To estimate an optimal portfolio among shares of JVB

-) To determine whether the shares of JVB in Nepal are over priced or under priced by analyzing the risk and return characteristic of the individual shares
-) To analyze comparative risk and return position of these sectors
-) To study systematic and unsystematic risk associated with security
-) To draw conclusion make relevant suggestions and practical ideas and materialize recommendation based on analysis of data

1.8 Limitations

This research explains and analyses the subject matter with the help of well known or already established analytical method and techniques, therefore as a conclusion-oriented research. Considering the above pattern following are the limitations of the research

1. Only six years of observation are analyzed
2. This study is mainly based on published secondary data
3. This study concerns only with the risk return and portfolio of joint venture banks.
4. Secondary data gathered from related sources are used.
5. This study has been conducted to fulfill the requirement of the MBS programme for a prescribed time, not for generalization purpose.
6. Analysis is mostly based on the tools developed in context of efficient markets conditions that may reduce validity of finding.
7. Due to time and resources constraint, only joint venture banks are selected for the study.

1.9 Organization of Study

The whole study has been organized into five different chapters. They are as follows:

Chapter one: Introduction

Chapter two: Review of Literature

Chapter three: Research Methodology

Chapter four: Presentation and Analysis of Data

Chapter five: Summary, Recommendation and Conclusion

The first chapter is introductory chapter, which contains general background of the study, size of the study, statement of problems, objectives of study, significance of study.

The second chapter deals with the review of literature broadly divided into many parts which includes publish books, article, reports, dissertation related to the topic of study.

The third chapter deals with methodology of research study. This chapter presents the whole procedure of this research work.

The fourth chapter deals with systematic presentation and analysis of data where various financial and statistical tools and technique are used to analyze and interpret data. It also includes the main findings based upon analysis.

Finally in the fifth chapter whole study are summarized. Conclusions of the whole study and supply of some valuable recommendations for the improvement is done.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Conceptual Review

“Don’t put all your eggs in one basket” is a time tested folk. Modern portfolio theory reconfirms it. Spreading the fund across a number of assets will eliminate some but not all of the risk. This is known as the principal of diversification.

“Individual securities have risk return characteristic of their own. Portfolios which are combination of securities may or may not take on the aggregate characteristic of their individual parts. Portfolio analysis considers the determination of future risk and return in holding various blends of individual securities”. (Fisher & Jordan, 2000:559)

“The term portfolio simply means collection of investment. For an investor through stock exchange the portfolio will be a collection of shareholding in different companies. For a property investor, portfolio will be collection of buildings. To a financial manager within an industrial company portfolio will be a collection of real capital projects. It will be apparent that the actual nature of the component of a portfolio depends on the population of opportunities from which selection has been made.” (Brokington, 1998:148)

Assumption

Portfolio Theory is based on the four basic assumptions:

1. All investor maximize one-period expected utility and exhibit diminishing marginal utility of wealth. This implies that investors visualize each investment opportunity as being represented by a probability distribution of addition to their

terminal wealth. Equivalently, all investors visualize assets as probability distribution of expected returns over some holding period.

2. Investor's risk estimator are proportional to the variability of the expected returns.
3. Investor's are willing to base their decisions solely in terms of expected return and risk. That is, utility(μ) is a function of variability of return (μ) and expected return $[E(r)]$. Symbolically, $\mu = f[\sigma, E(r)]$
4. For any given level of risk, investors prefer higher return to lower returns.

In essence, portfolio analysis is based on the premise that the most desirable are those which have

1. The minimum expected risk at any given expected rate of return or conversely,
2. The maximum expected rate of return at any given level of expected risk

2.1.1 Modern Portfolio Theory

Financial pioneer Harry M. Markowitz originally proposed portfolio theory in 1952. He won the Nobel Prize in Economics for having developed the theory of portfolio selection.

“A portfolio is a collection of investment securities. Portfolio theory deals with the selection of optimal portfolio that is portfolio that provides the highest return or the lowest possible risk for an specified rate of return. (Weston & Copeland, 1992:302)

“The portfolio of investment can be formed with just single assets or several assets and the risk and return of individual asset or assets included in a portfolio determine the risk and return of portfolio. While the return on a portfolio is a measure as the weighted average of return on the assets included the portfolio risk depends on several facto such

as return on individual assets, their weights in portfolio and the correlation included in the portfolio.

The portfolio theory explains the relationship between asset's risk and return. The theory is founded on the measurement of risk and return of p. it was Harry Markowitz, a practitioner, who first developed the model. The model emphasizes the risk (measured in terms of variance of portfolio return) and return (measured in terms of mean return of portfolio) as the only two major reflectors of portfolio performance. He used these two parameters in developing modern portfolio theory.” (Pradhan, 2000:267)

Portfolio Theory Assumptions

“The portfolio selection model that has been developed by Markowitz, is based on the following assumptions regarding investor behaviour.” (Bhalla, 2001:500)

-) Investor considers each investment alternative as being represented by a probability distribution of expected returns over some holding period.
-) Investors maximize one period-expected utility and possess utility curve, which demonstrate diminishing marginal utility of wealth.
-) Individual estimates risk on the basis of the variability of expected returns.
-) Investors base decisions solely on expected return and variance only.
-) For a given level of risk, investors prefer high return to lower returns. Similarly, for a given level of expected return investor prefer less risk to more risk.

“According to Markowitz, the investors should maximize expected return. This rule implies that the non-diversified single security portfolio with the highest expected return is the most desirable portfolio. Expected rate of return for any asset is the weighted

average rate of return, applying the probability of each rate of return as the weight.”
(Western & Brigham, 1982:260)

2.1.2 Introduction to Portfolio Management

Portfolio Management is concerned with efficient management of portfolio investment in financial assets, including shares and debentures of companies. The management may be by professional, by others, or by individuals themselves. A portfolio of an individual or a corporate unit is the holding of securities and investment in financial assets. These holdings of securities are the result of individual preferences and decisions regarding risk and return. The process of Portfolio Management is closely and directly linked with process of decision making the correctness of which cannot be ensured in all cases.

“Portfolio Management is the art of handling a pool of funds so that it not only preserves its original worth but also over time appreciates in value and yields an adequate return consistent with the level of risk assumed.” (Cohen, Zinbarg & Zeinkal, n.d.:591)

Portfolio Management is the process of selecting a bundle of securities that provides the investing organization a maximum yield for a given level or risk for alternatively ensuring minimum risk for a given level of return. Portfolio Management can also be taken as a risk and return management. It aims to determine an appropriate assets mix, which attains optimum level of risk and return.

Objective of Portfolio Management

“The portfolio manger’s task is to select the investment weights that will result in dominant investment. Hereafter, dominant asses will be called “efficient portfolios”

whether they contain one or many assets. An efficient portfolios, then, is any assets or combination of assets that has

1. The maximum expected return in its class, or conversely
2. The minimum risk at its level of expected return.

The objective of Portfolio Management is to analyze different individual assets and delineate efficient set of portfolios. The efficient set of portfolios comprises the “efficient frontier”. The efficient frontier is the locus of points in risk and return space having the maximum return at each risk class. The efficient frontier dominates all other investments.”(Clark, Gordon, Sharpe & Bailey,n.d.:236)

The objective of Portfolio Management are as follows:

-) capital
-) safety or security of an investment
-) income by way of individual and interests
-) liquidity
-) marketability
-) tax planning-capital gain tax, income tax and wealth tax
-) risk avoiding or minimization of risk

2.1.3 Portfolio selection

“In practice choosing a discount rate is seldom so easy. For example, you must learn how to adjust for the extra risk caused by company borrowing and how to estimate the discount rate for projects that do not have the same risk as the company’s existing business. There are also tax issues, but these refinement can wait for later.

Let us review four basic principal of portfolio selection

1. Investors like high return and low standard deviation. Common stock portfolios that offer the highest expected return for a given standard deviation are known as efficient portfolios.
2. If you want to know the marginal impact of a stock on the risk of a portfolio, you must look not at the risk of that stock in isolation, but at its contribution to the portfolio risk. That contribution depends on the stock's sensitivity to changes in the value of the portfolio.
3. As stock's sensitivity to changes in the value of the market portfolio is know as beta. Beta, therefore, measures the marginal contribution of a stock to the risk of the market portfolio.
4. If investors can borrow and lend at the risk free rate of interest, then they should always hold a mixture of the risk free investment and one particular common stock portfolio. The composition of this stock portfolio depends only on investor's assessment of the prospects for each stock and not on their attitude to risk. If they have no superior information, investors should hold the market portfolio.

Risk premium always reflects the contribution to portfolio risk. If the portfolio you have choosen is efficient, each of your investment must be working equally hard for you. So if one stock has a greater marginal effect on portfolio risk than another stock, it must also have proportionately greater expected return.”(Brealey & Myers,1997:181-182)

2.1.4 Investment, Risk and Return

Investment

Investment in its broadest sense means the sacrifice of current dollars for future dollars. Two different attributes are generally involved: time and risk. The sacrifice takes place in present and is certain. The reward comes later, if at all and the magnitude is generally uncertain.”(Sharpe, Gordon & Bailey, 1995:1)

Common stock

“Common stockholder of a corporation are its residual owners, their claim to income and assets comes after creditors and preferred stockholders have been paid full. As a result, stockholders return on investment is less certain than the return to lender of a preferred stockholder. On the other hand, the share of common stock can be authorized wither with or without par value. The par value of a stock is merely a stated figure in the corporate charter and is of little economic significance.”(Van Horne, 1997:560)

Risk

“Risk is defined most generally as a probability of the occurrence of unfavorable outcome. But risk has different meaning in different context. In our context, two measures developed from the probability distribution have been used as initial measures of return and risk. They are the mean and standard deviation of the probability distribution.”(Weston & Brigham, 7th edition)

Diversifiable and non-diversifiable risk

Total risk: the total variation of the rate of return for an individual security as measured by the standard deviation or variance of the rate of return. According to the CAPM, total risk is divided into two parts. They are

Unsystematic risk: the portion of the risk that can be diversified away is the unsystematic risk. It is also called as non-market risk or avoidable risk or company specific risk or diversifiable risk. It is caused by events particular to the firm. For example, labor strike, management error, inventions, advertising campaigns, shifts in consumer taste, lawsuits etc.

Systematic risk: the portion of the total risk of an individual security caused by market factors that simultaneously affect the prices of all securities. It cant be diversified away. It is also called market risk or unavoidable risk or non-diversifiable risk or beta risk. It stems from factors, which systematically affect all firms, such as war, inflation, recession, high interest rates, depressions, and long term changes in consumption in the economy.”(Thapa,2003:71)

Total Risk=Systematic Risk+ Unsystematic Risk

$$\sigma_j^2 = (\beta_j)^2 \sigma_m^2 + \text{Var}(e_j)$$

Return

“Risk and return are the determinant for the valuation of securities. When the firm should recognize that the forecast return may or may not be achieved. The tough part of decision-making under uncertainty is deciding how much extra return should be required to accept a measurable risk. Therefore, risk may be defined as the likelihood that the

actual return from an investment will be less than the forecast return. Stated differently, it is the variability of return from an investment.”(Hampton, 1996:340-345)

2.1.5 Risk and Return of a Portfolio

Portfolio risk and return measured during the time interval is required. Two kinds of risk can be estimated in the portfolio

- (a) market risk or systematic risk measured by its beta
- (b) total risk measured by its standard deviation

“Most financial assets are not held in isolation rather they are held as parts of portfolios. Banks, pension funds, insurance companies, mutual funds, and other financial institutions are required by law to hold diversified portfolios. Even individual investors- at least those whose security holding constitute a significant part of their total wealth- generally hold stock portfolios, not the stock of only one firm. This being the case, from an investor’s standpoint, the fact that a particular stock goes up or down is not very important; what is important is the return on his or her portfolio; and the portfolio risk. Logically, then, the risk and return of an individual security should be analyzed in terms of how the security affects the risk and return of the portfolio in which it is held.” (Western & Brigham, n.d:183)

(1) Portfolio Expected Return

“The expected return on a portfolio is the weighted average expected return of the individual stocks in the portfolio. The weights are equal to the proportion of total funds in each security. Symbolically, the expected return on a portfolio is

$$R_p = W_1K_1 + W_2K_2 + \dots + W_nK_n$$

Where,

R_p =Portfolio Expected Return

W_1 =Weight for Stock

W_2 =Weight for Stock 2

K_1 =Expected Return for Stock 1

K_2 =Expected Return for Stock 2

(2) Portfolio risk

Conceptually, the risk of a portfolio can be measured in much the same way as the risk of a single asset. But their computation is to be differentiated as portfolio holding certain benefits to investors as compared to holding of single assets. portfolio investments provide an opportunity to diversify investments. Successful diversification may make the risk of a portfolio investment less than the risk of the individual assets.

Therefore the portfolio standard deviation, as a measure of risk, is not the simple weighted average of individual security standard deviations mainly because of the correlation/covariance between the return on different securities constituting the p.”

(Khan & Jain, 1999:2.23)

For the portfolio consisting of two assets A and B

$$\sigma_p = \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2W_A W_B \text{COV}_{AB}}$$

σ_p = Standard Deviation of portfolios rate of return

W_A = weight for stock

W_B = weight for stock B

COV_{AB} = Covariance of returns between assets A and B

2.2 Review of Related Studies

This section is developed to the review of major related literature concerning the portfolio analysis. For this study, various books, journals, articles and past thesis are reviewed. Different visions expressed by different great scholars in respect of portfolio analysis are considered. The concept of portfolio analysis would be clear.

2.2.1 Review of popular models of Portfolio

Markowitz Model

“Harry Markowitz drew attention to the common practice of portfolio diversification and showed exactly how an investor can reduce the standard deviation of portfolio returns by choosing stocks that do not move exactly together. But Markowitz did not stop there- he went on to work out the basic principles of portfolio construction. These principles are the foundation for much of what has been written about the relationship between risk and return.” (Brealey & Myers 1997:173)

“Markowitz used the variance of return as the measure of risk. The risk of the portfolio is not the weighted average of the variance of the expected returns of the individual assets in the portfolio. Estimating portfolio risk in this way would obscure the effect of combining assets with different return patterns in a portfolio.

The portfolio model developed by Markowitz is based on the following reasonable assumptions:

1. The expected return from an asset is the mean value of a probability distribution of future returns over some holding period.

2. The risk of an individual asset of portfolio is based in the variability of returns (i.e. standard deviation or variance)
3. Investors depend solely on their estimates of return and risk in making their investment decisions. This means that an investor's utility (indifference) curves are only a function of expected risk and return.
4. Investors adhere to the dominance principle. That is, for any given level of risk, investors prefer assets with a higher expected return to assets with a lower expected return; for assets with the same expected return, investors prefer lower to higher risk.”(Cheney & Moses, n.d.:651)

The Single Index Model

“William Sharpe, who among other has tried to simplify the process of data inputs, data tabulation, and reaching a solution, has developed a simplified variant of the Markowitz model that reduces substantially its data and computational requirements.

First simplified model assume that fluctuations in the value of a stock relative to that of another do not depend primarily upon the characteristic of those two securities alone. The two securities are more apt to reflect a broader influence that might be described as general business conditions. Relationship between securities occurs only through their individual relationship with some index or indexes of business activity. The reduction in the number of covariance estimates needed eases considerably the job security-analysis and portfolio analysis computation.” (Fisher & Jordan, 2000: 575)

“Sharpe assumed that, for the sake of simplicity, the return on a security could be regarded as being linearly related to a single index like the market index. Theoretically, the average can be treated as a surrogate for the market index. Acceptance of the idea of a market index, Sharpe argued, would obviate the need for calculating thousands of covariance between individual securities, because any movements in securities could be index. The simplification of the Markowitz Model has come to be known as the Market Model or Single-Index Model(SIM).” (Bhalla, 2001:526)

$$R_i = \alpha_i + \beta_i I + e_i$$

R_i = Expected return on security i

α_i = intercept of a straight line or alpha coefficient

β_i = slope of a straight line or beta coefficient

I = expected return on index (market)

e_i = error return with a mean of zero and a standard deviation which is a constant

Capital-Assets Pricing Model (CAPM)

“It is the model that describes the relationship/ trade off between risk and expected return/required return. It explains the behaviour of security prices and provides a mechanism to assess the impact of a proposed security investment on investors’ overall portfolio risk and return. The CAPM provides a framework for basis risk-return trade offs in Portfolio Management. It enables drawing certain implications about risk and the size of risk premium necessary to compensate for bearing risk” (Khan & Jain. 1999:2.23-2.25)

“The most important aspect of risk is the overall risk of the firm as viewed by investors in marketplace. Overall risk significantly affects investment opportunities and even more important the owner’s wealth. The basis theory that links together risk and return for all assets is commonly called the capital asset pricing model (CAPM).” (Gitman, 1998:221)

Assumptions

“The CAPM is based on the following assumptions:

1. Individual are risk averse.
2. Individual seek to maximizes the expected utility of their portfolio over a single period planning horizon.
3. Individuals have homogenous expectations- they have identical subjective estimates of the means, variances and covariance among returns.
4. Individuals can borrow and lend freely at a risk less rate of interest.
5. The market is perfect there are no taxes; there are no transaction costs; securities are completely divisible; the market is competitive.
6. The quantity of risky securities in the market is given.” (Chand,2002:166)

Using beta as our index of non diversifiable risk, the CAPM model is given in the equation given below

$$R_j = R_f + (R_m - R_f) b_j$$

R_j = the required rate of return for stock j

R_f = risk free rate of return

R_m = the required rate of return on the market portfolio

b_j = the beta coefficient for asset j

Arbitrage Pricing Theory (APT)

“The limitations of CAPM in the context of real world situation raised several questions with regard to its application. Although the model has been a standard basis for stock investment analysis, practitioners at times have expressed impracticality of the model. They use it with some cautions for the reason that, first, the CAPM is based on only a single factor of the average market performance, and second, it is based on some unrealistic assumption. Such a reservation on the part of the users is called for a new model. Stephen A. Ross’s provided a new more general multifactor model (1976) called Arbitrage Pricing Theory (APT), with flexibility to account for any number of relevant contributing factors.

The APT is said to be more realistic on the ground that it is more general than CAPM. The CAPM assumes that the rate of return on a security is influenced by only one factor, that is, the average market performance. Unlike CAPM, the APT assumes that the rate of return on marketability security is a linear function of the movement of a set of economic factors common to all securities. The random rate of return under APT model is a linear function of k factors as follows:” (Pradhan, 2000:356)

$$R_j = E(R_j) + b_{j1} F_1 + b_{j2} F_2 + \dots + b_{jk} F_k + e_j$$

R_j = random rate of return stock j

$E(R_j)$ = expected rate of return on stock j

b_{jk} = sensitivity of stock j’s return to kth factor

F_k = mean zero kth factor common to the returns of all assets

e_j = random error term indicating the unique effect on return

2.2.3 Review of Unpublished Thesis

Until now, there is not much thesis/project report or article available like other topics of investment. Some thesis related to the topic 'portfolio analysis' has been conducted for the fulfillment of master degree in T.U which are reviewed here.

Khaniya (Banjade), Kalpana,(2003) in her thesis entitled “**Investment Portfolio Analysis of Joint Venture Banks**” has been done in 2003. The study is based on five joint venture banks and they are: NABIL, SCBNL, HBL, NBBL & EBL. The specific objectives are as follows:

1. To analyze the risk and return ratios of commercial bank
2. To evaluate the financial performance of joint venture banks
3. To provide the suggestive package based on the analysis of data
4. To study existing investment policies taken by Nabil in various sectors
5. To study portfolio structure of Nabil bank ltd in investment as compared to other joint venture banks.
6. Preference given by Nabil bank ltd for investment between
 -) loan investment
 -) investment in fixed assets
 -) investment in financial assets

Major Finding

Based on the analysis of the various data remarkable findings drawn up. The major finding are as follows

-) SCBNL and HBL have better position. NBBL and NABIL have a low position in the industry. But Everest Bank has a very low position in the industry because of

- having lowest mean return on shareholder's fund resulting from the negative returns in the fiscal years 1995/96 and 1996/97
-) SCBNL has the highest mean return and EBL has the lowest return. Except EBL, all other four banks i.e. NABIL, SCBNL, HBL and NBBL have good performance
 -) Among other joint venture banks, SCBNL has the highest return and EBL has above mean return than industry averages. SCBNL and EBL mobilizes the funds in investment title is higher than the standard ratio.
 -) NABIL, SCBNL and HBL are investing low amount of deposits on loans and advances which is lower than industry average and NBBL and EBL have invested a high amount of deposits to loans and advances title which is higher than industry average.
 -) NABIL is investing the highest amount of funds on NRB bond as compared to other JVBs i.e. 0.4% and SCBNL and HBL have invested above industry average
 -) Himalayan bank has the lowest beta coefficient among the five JVBs which means that the systematic risk of Himalayan Bank is the lowest among JVBs. The portfolio return of NBBL is 94%. This return is the average of capital gain yield and dividend yield.

Shakya ,Nabina, (2004) in her thesis entitled “**Analysis of Risk and Return and Application of SML on common stock of commercial banks in Nepal**”, she has taken three banks as a sample size from listed commercial banks. The main objective of the

study is to analyze the risk, return and other relevant variables that help decision making about investment on securities of the commercial bank.

The specific objective of the study are:

-) To analyze attitude and awareness of individual investors regarding common stock investment
-) To show and analyze the price trend of the individual stock and market index
-) To analyze the risk and return associated with the investment.
-) To show the SML (security market line) and to analyze whether the stock is under priced and overpriced.
-) To show the Security Characteristics Line of individual stock.

Major Findings

-) Return is an income received by investors for earning risk within the stock. Expected return on Common Stock of NBB has the highest with 0.4705, SCBL and NABIL bank has the expected return of 39.02%
-) Where there is return, there will be risk also. Common stock of NBB is most risky assets having highest standard deviation with 0.930 and SCBL's stock is less risky with standard deviation of 0.5542. whereas NABIL bank has Standard deviation of 0.6162.
-) C.V. measures the risk in unitary basis that means it shows how many unit of risk should be bear to gain one unit of return. In terms of C.V, SCBL has the lowest C>V i.e 1.4203 and highest in NABIL Bank with 2.0488
-) Among the three stocks, NBB's stock is more volatile having beta of 2.1785 and least volatile stock is SCBL's stock with 1.2142 beta coefficient. In fact all of

- them are volatile than the market portfolio or aggressive stocks having beta greater than 1
-) All three stocks are under priced having greater ERR than RRR and lies above the SML.
 -) In terms of S.D, others sector ahs highest S.D. i.e 0.5045 and lowest S.D. in trading sector with 0.0833
 -) Among the e sectors, banking sector is more volatile with market having highest beta with 1.0728 and the stock of trading sector is defensive having lowest beta with 0.0372. After banking sector, others sector has the maximum beta with 0.7201.
 -) Nepalese stock market is in the emerging stage in our country. Nepalese investors are not able to analyze the securities as well as market properly due to lack of information and poor knowledge on common stock

CHAPTER 3

RESEARCH METHODOLOGY

Research methodology may be defined as “a systematic process that adopted by the researcher in studying problem, with certain objective in view”. In other words, research methodology describes the methods and process applied in the entire aspect of the study focus of data, data gathering instrument and procedure, data tabulating and processing and methods of analysis.

3.1 Research Design

“A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure.”(Kothari,1990:39)

Research design is the plan, structure and strategy of investigation conceived so as to obtain answers to research questions and to control variance.

3.2 Population and Sample

Population of the study is all the listed commercial banks in Nepal Stock Exchange (NEPSE). For this research, overall listed common stock has been considered as the population. Total numbers of commercial banks are 23 and all commercial banks are listed in NEPSE.

For the research purpose some of them are taken as a sample, which is listed in Nepal Stock Exchange (NEPSE). And the samples are the common stock of six listed companies from commercial banking sector. i.e. Nabil Bank Ltd, Standard Chartered Bank Ltd, Himalayan Bank Ltd, SBI Nepal Ltd, Nepal Bangladesh Bank Ltd and Everest Bank Ltd.

3.3 Sources of Data

This research study is mainly based on secondary (published) data. However, to certain extent, primary data are also used. The required data for the study are collected from the concerned publications from different publishers. For the purpose of the study, the secondary data are gathered from various sources such as books, journal, articles, reports, past thesis etc. Necessary information has been gathered from Nepal Stock Exchange, Nepal Rastra Bank, Central Library and various websites.

3.4 Data Analysis Tools

On the basis of historical data, financial as well statistical tools are used to make the analysis more convenient, reliable and authentic.

3.4.1 Financial Tools

The following financial tools have been used while making analysis of data

Portfolio Expected Return

“The expected return of a portfolio is the weighted average of the expected returns of the individual assets in the portfolio. The weights are the proportion of the investor’s wealth invested in each asset.” (Cheney & Moses, n.d: 652)

$$R_p = W_1K_1 + W_2K_2 + \dots + W_nK_n$$

Where,

R_p = Portfolio Expected Return

W_1 = Weight for Stock

W_2 = Weight for Stock 2

K_1 = Expected Return for Stock 1

K_2 = Expected Return for Stock 2

Portfolio risk

“In order to calculate the risk of a portfolio, consideration must be given not only to the risk of the individual assets in the portfolio and their relative weights but also to the extent to which assets’ return move together. We measure the risk of an individual asset by the variance of returns or its square roots, the standard deviation. The degree to which the assets returns move together is measured by the covariance or correlation coefficient. By combining the measures of individual asset risk (variance or standard deviation), relative asset weights and the co-movement of assets’ return (covariance or correlation), the risk of the portfolio can be estimated.” (Cheney & Moses)

Portfolio risk for two assets A and B is given by

$$p = \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2W_A W_B \text{COV}_{AB}}$$

p = Standard Deviation of portfolios rate of return

W_A = weight for stock

W_B = weight for stock B

COV_{AB} = Covariance of returns between assets A and B

Minimum risk portfolio

It is the portfolio with the lowest level of risk in the efficient frontier. It is also called risk minimizing weight or optimal weight. In two stock portfolio, the optimal weight to invest in stock A and stock B are calculated as follows (Thapa, 2001:32)

$$W_A = \frac{\sigma_B^2 - \text{Cov}(R_A, R_B)}{\sigma_A^2 + \sigma_B^2 - 2\text{Cov}(R_A, R_B)}$$

where,

W_A = optimal weight to invest in stock A

W_B = optimal weight to invest in stock B

3.4.2 Statistical Tool

The following statistical tool have been used while making analysis of data

Expected Return (Arithmetic Mean)

Expected return is the arithmetic average of the historical returns forecasted for next period. It is obtained by dividing the sum total of the returns by the number of the observation. In probability distribution, the expected return is obtained as the weighted average of the probability and the forecasted returns.

Mathematically, expected return can be expressed as

$$R_m = \frac{\sum(R_m)}{N}$$

Where,

R_m = Expected return

$\sum(R_m)$ = Sum of return for a given period

N = no of observation

Standard Deviation

Standard deviation is defined as the positive square root of the mean of the square of the deviation taken from the arithmetic mean. It is denoted by σ . It is said to be the best measure of dispersion as it satisfies most of the requisites of a good measure of dispersion. Standard deviation is an estimate of the likely divergence of an actual return from an expected return. It measures the risk of the return. The higher the standard deviation, the more risk will be in an asset.

Mathematically, standard deviation can be expressed as

$$\sigma_m = \sqrt{\frac{(\underline{R}_m - R_m)^2}{N-1}}$$

σ_m = standard deviation of market

\underline{R}_m = risk of market

R_m = expected return of market

N = no of observation

Variance

Variance is the square of standard deviation. It is denoted by sigma squared (σ^2). It is the sum of the squared deviation from mean divided by number of observation in case of historical returns. In case of probability distribution, it is the sum of the squared deviations multiplied by the probabilities.

$$\sigma^2 = \frac{(\underline{R}_m - R_m)^2}{N-1}$$

Where,

σ^2 = Variance

R_m = Risk of market

R_m = Expected return of market

N = No of observation

Coefficient of Variation

Coefficient of variation is the standardized measure of risk per unit of return. It is calculated as the standard deviation divided by the expected return. It provides a more meaningful basis for a comparison when two or more than two investments of different expected return and standard deviation are to be compared.

$$C.V = \frac{\sigma}{r}$$

where,

C.V = coefficient of variation

σ = standard deviation

r = expected return

Total risk

The total risk of return of an asset or portfolio is measured by variance and standard deviation. The total risk can be divided into two parts: diversifiable risk and undiversifiable risk.

Total Risk=Systematic Risk+ Unsystematic Risk

$$\sigma_j^2 = (\beta_j)^2 (\sigma_m^2) + \text{Var}(e_j)$$

Covariance

Covariance is a statistical measure of the relationship between two random variables. That is a measure of how two random variables, such as the return on securities i and j move together. A positive value for covariance indicates that the security returns tend to move in the same direction. A negative covariance indicates a tendency for the returns to offset one another. A relatively small or zero value for the covariance indicates that there is little relationship between return for two securities.

Mathematically, covariance can be expressed as,

$$\text{Cov} (r_i , r_m) = \frac{(R_i - R_i)(R_m - R_m)}{N - 1}$$

Where,

$\text{Cov} (r_i , r_m)$ = covariance between stock i and market

N = number of observation

Correlation

Correlation is a statistical concept measuring the extent to which two variable tend to move together. Correlation coefficient always lies between -1 and +1. A value of -1 represents perfect negative correlation and a value of +1 represents perfect positive correlation. Most cases lie between these two extreme values. When the two variable have no relationship, they are uncorrelated and the correlation coefficient is zero. If two assets have perfectly negative correlation, the minimum risk of the portfolio of those assets is zero meaning it is possible to create a risk less portfolio by perfectly negatively correlated assets. If the assets are perfectly positively correlated, no risk can be reduced by making the portfolio of such assets. If the correlation is less than +1, risk reduction is possible by making the portfolio.” (Dahal:2003)

Correlation coefficient between two assets returns can be calculated as below:

$$\text{Cor} (r_i , r_m) = \frac{\text{Cov} (r_i , r_m)}{\sigma_i \sigma_m}$$

$\text{Cor} (r_i , r_m)$ = correlation of stock i and market

$\text{Cov} (r_i , r_m)$ = covariance of stock i and market

σ_i = standard deviation of stock i

σ_m = standard deviation of market

Beta coefficient

“The beta coefficient, b, is used to measure non-diversifiable risk. It is an index of the degree of movement of an asset’s return in response to a change in the market return. The beta coefficient for an asset can be found by examining the asset’s historical returns relative to the returns for the market. The market return on the market portfolio of all traded securities.” (Gitman, 1988:230)

$$b_i = \frac{\text{Cov} (r_i , r_m)}{\sigma_m^2}$$

b_i = beta coefficient of stock i

$\text{Cov} (r_i , r_m)$ = covariance of return for asset i with the market

σ_m^2 = variance of return for market portfolio or individual assets

3.5 Limitation of the Methodology

In Nepalese context, data problem is taken as the major problem for the study. There is a considerable place to argue regarding its accuracy and reliability. There are many limitation, which weaken the generalization e.g. inadequate coverage of financial sector, time period taken and other variable

CHAPTER 4

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

In this chapter effort has been made to analyze risk return and portfolio behaviour of joint venture banks of Nepal. The analysis of data consists of organizing, tabulating and assessing financial and statistical result. This chapter also describes the detail data of MPS and dividend of each bank and NEPSE index. Tables and diagrams are listed to make the result more simple and understandable with reference to the various readings and reviews of literature in the proceeding chapter.

4.1 Analysis of Market Risk and Return

According to securities trading report published by NEPSE on 2006/07, the yearly closing price of stock and yearly market index are given in the following table

Table no: 4.1
Closing Price of Equity

Fiscal year	NABIL	SCBNL	HBL	Nepal SBI	NBBL	EBL	NEPSE INDEX
2001/02	735	1550	1000	401	1019	130	227.54
2002/03	735	1640	836	255	360	115	204.86
2003/04	1000	1745	840	307	290	680	222.04
2004/05	1505	2345	920	335	265	870	286
2005/06	2240	3775	1100	612	199	1379	683.95
2006/07	5050	5900	1760	1176	550	2430	963.36

The above table shows that, except for Nepal Bangladesh Bank, all banks have the highest closing price in the fiscal year 2006/07. However, for Nepal Bangladesh Bank,

the highest closing price is in the year 2001/02 at Rs.1019. The lowest closing price for Nabil bank was Rs. 735 in the year 2001/02, for SCBNL it was Rs. 1550 in the year 2001/02, for HBL it was Rs. 836 in the year 2002/03, for Nepal SBI bank it was Rs. 255 and for EBL it was Rs. 115

Table no: 4.2
Expected Return, Standard Deviation and Coefficient of Variation of NEPSE Index

Fiscal Year	NEPSE Index	R_m	$(R_m - R_m)$	$(R_m - R_m)^2$
2002/03	204.86	-0.0997	-0.5139	0.26409321
2003/04	222.04	0.0839	-0.3303	0.10909809
2004/05	286	0.2881	-0.1261	0.01590121
2005/06	683.95	1.39	0.9758	0.95218564
2006/07	963.36	0.4085	-0.0057	0.00003249
Total	NEPSE Index	(R_m) =2.0708		$(R_m - R_m)^2$ =1.34131

$$\begin{aligned} \text{Expected Return } (R_m) &= \frac{(R_m)}{N} \\ &= \frac{2.0708}{5} \\ &= 0.4142 \end{aligned}$$

$$\begin{aligned} \text{Standard Deviation } (s_m) &= \sqrt{\frac{(R_m - R_m)^2}{N-1}} \\ &= \frac{1.34131}{5-1} \\ &= 0.579 \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation} &= \frac{s_m}{R_m} \\ &= \frac{0.579}{0.4142} \\ &= 1.398 \end{aligned}$$

The market return was negative in the year 2002/03. Then it shows an increasing trend until year 2005/06, where the return is highest. However, in the year 2006/07 the return is highest at 0.4085. Above table shows expected return 0.4142, Standard Deviation 0.579 and Coefficient of Variation 1.398.

4.2 Analysis of Individual Joint Venture Bank

As the study has taken a special reference to joint venture banks, common stock of each listed joint venture banks are analyzed here separately. Until January, 2008 six joint venture banks are operating in Nepal and all are listed in NEPSE index. The six joint venture banks are mentioned below

Table no: 4.3
List of Joint Venture Banks in NEPSE

S.N	Name of Bank	Incorporation date	Listing Date in NEPSE	NEPSE Code	NEPSE Code No
1	Nepal Arab Bank Ltd	1984 AD	24/11/1985	NABIL	102
2	Standard Chartered Bank Nepal Ltd	1985 AD	04/07/1988	SCB	104
3	Himalayan Bank Ltd	1992 AD	05/07/1993	HBL	105
4	Nepal SBI Ltd	1993 AD	17/01/1995		106
5	Nepal Bangladesh Bank Ltd	1992AD	24/12/1995	NBB	107
6	Everest Bank Ltd	1992 AD	07/04/1996	EBL	108

4.1.2 Nepal Arab Bank Limited (NABIL)

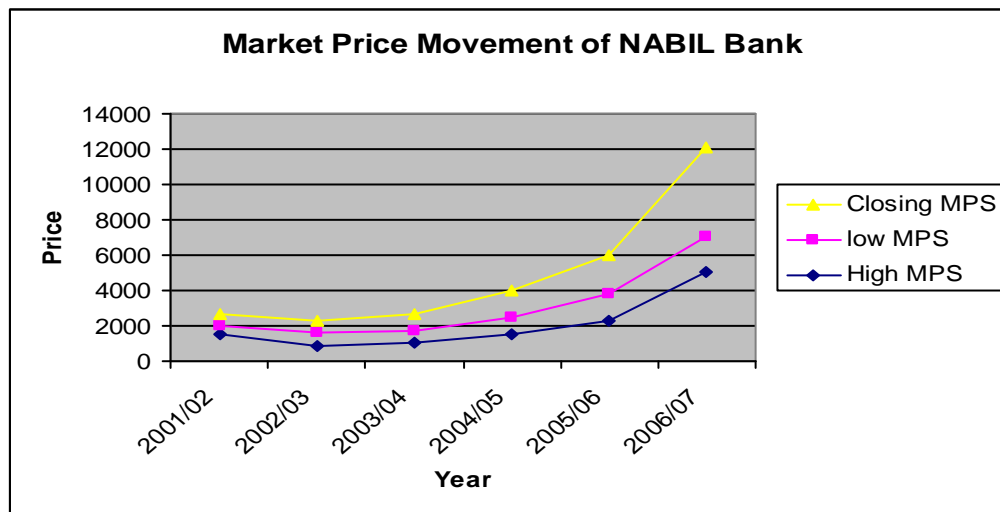
Nepal Arab Bank Limited (NABIL) is the first joint venture bank of Nepal. It was established in 1984. 50% equity shares is owned by National Bank Ltd, Bangladesh (NBLB).NBLB is managing the bank with technical services agreement signed between NBLB on June 1991.

The table below shows the Market Price per share and dividend value of Nabil Bank.

Table no: 4.4
MPS and Dividend Data of NABIL Bank

F/Y	High MPS	Low MPS	Closing MPS	Cash Dividend	Stock Dividend(%)	Total Dividend (Rs)
2001/02	1500	465	735	20	0	20
2002/03	875	700	735	50	0	50
2003/04	1005	705	1000	65	0	65
2004/05	1515	1000	1505	70	0	70
2005/06	2300	1500	2240	85	0	85
2006/07	5059	2025	5050	100	40	100

Figure No: 4.1



From the above figure and table, closing MPS of the bank is in an increasing trend from the year 2001/02 to 2006/07. The MPS range between Rs 735 and Rs 5050. Cash dividend has been declared every year from 2001/02 to 2006/07 whereas stock dividend has been declared only in year 2006/07. For year 2006/07, cash dividend is assumed as total dividend because the value of MPS is not known for 2007/08 and stock dividend can not be calculated.

Table no: 4.5
Expected Return, Standard Deviation and Coefficient of Variation of NABIL Bank

Fiscal Year	Closing MPS	Total Dividend	R_i	$(R_i - \bar{R}_i)$	$(R_i - \bar{R}_i)^2$
2002/03	735	50	0.068	-0.5192	0.269569
2003/04	1000	65	0.449	-0.1382	0.019099
2004/05	1505	70	0.575	-0.0122	0.000149
2005/06	2240	85	0.5449	-0.0423	0.001789
2006/07	5050	100	1.299	0.7118	0.506659
Total			(\bar{R}_i) =2.9359		$(R_i - \bar{R}_i)^2$ =0.7973

$$\begin{aligned} \text{Expected Return } (\bar{R}_i) &= \frac{\sum R_i}{N} \\ &= \frac{2.9359}{5} \\ &= 0.5872 \end{aligned}$$

$$\begin{aligned} \text{Standard Deviation } (\sigma) &= \sqrt{\frac{\sum (R_i - \bar{R}_i)^2}{N-1}} \\ \sigma &= \sqrt{\frac{0.7973}{5-1}} \\ &= 0.4464 \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation} &= \frac{\sigma}{\bar{R}_i} \\ &= \frac{0.4464}{0.5872} \end{aligned}$$

$$= 0.76$$

The table shows that the bank has a positive realized rate of return from year 2002/03 to 2006/07 and is in an increasing trend except in year 2005/06 where it has decreased slightly by 0.0301. Expected rate of return is 0.5872, standard deviation is 0.4464 and coefficient of variation is 0.76.

Table no: 4.6
Calculation of Covariance and Beta Coefficient

F/Y	$(R_i - R_i)$	$(R_m - R_m)$	$(R_i - R_i) (R_m - R_m)$
2002/03	-0.5192	-0.5139	0.266817
2003/04	-0.1382	-0.3303	0.045647
2004/05	-0.0122	-0.1261	0.001538
2005/06	-0.0423	0.9758	-0.04128
2006/07	0.7118	-0.0057	-0.00406
Total			$(R_i - R_i) (R_m - R_m) = 0.268669$

$$\begin{aligned} \text{Covariance, } \text{Cov}(r_i, r_m) &= \frac{(R_i - R_i)(R_m - R_m)}{N-1} \\ &= \frac{0.268669}{5-1} \\ &= 0.0672 \end{aligned}$$

$$\begin{aligned} \text{Beta Coefficient } (\beta_i) &= \frac{\text{Cov}(r_i, r_m)}{\sigma_m^2} \\ &= \frac{0.0672}{0.1124} \\ &= 0.5976 \end{aligned}$$

From above table, it is clear that the Beta coefficient of Nabil Bank is 0.5976. Beta less than 1 shows that the stock of Nabil Bank is less volatile than the market and that it is a defensive stock.

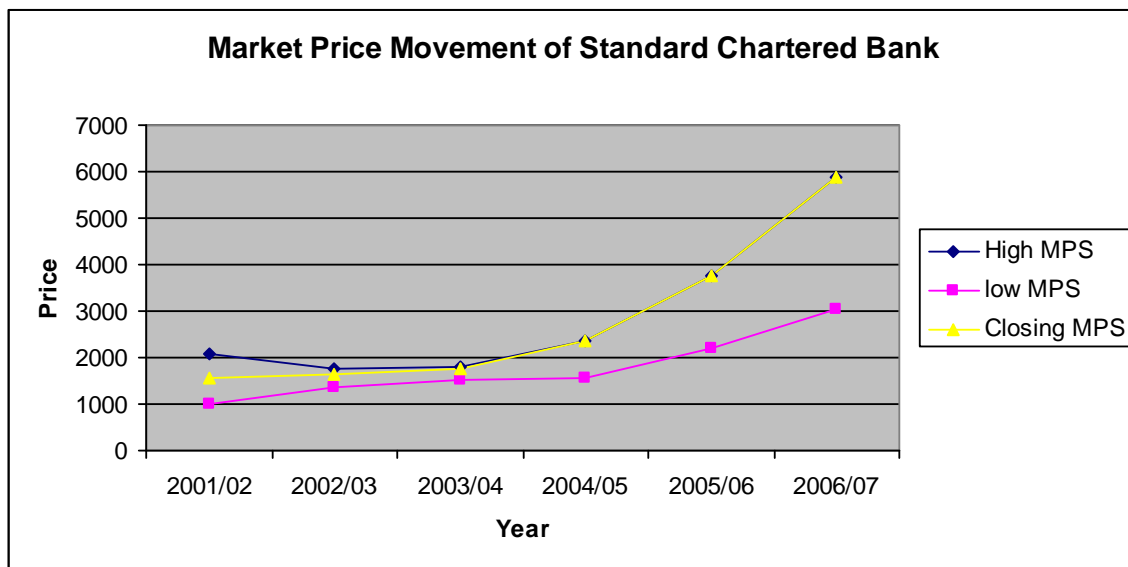
4.1.3 Standard Chartered Bank Nepal Ltd

Standard Chartered Bank Nepal Limited has been in operation in Nepal since 1987. Today the Standard Chartered Group has 75% ownership in the company and general public has 25% ownership. The table below shows the value of Market price of share and dividend of Standard Chartered Bank Nepal Ltd.

Table no: 4.7
MPS and Dividend Data of SCBNL

Fiscal Year	High MPS	Low MPS	Closing MPS	Cash Dividend	Stock Dividend(%)	Total Dividend
2001/02	2100	1000	1550	100	0	100
2002/03	1760	1380	1640	110	10	284.5
2003/04	1800	1520	1745	110	0	110
2004/05	2350	1553	2345	120	0	120
2005/06	3775	2200	3775	130	10	720
2006/07	5900	3058	5900	80	50	80

Figure no: 4.2



From the figure and the table, we can clearly conclude that the closing MPS of Standard Chartered Bank Nepal is in an increasing trend. It has increased from Rs. 1550 to Rs. 5900. The bank has declared cash dividend every year from 2001/02 to 2006/07 and stock dividend in 2002/03, 2005/06 and 2006/07. The total dividend for 2006/07 is equal to the cash dividend of Rs. 80 as the stock dividend can not be calculated because the MPS of 2007/08 is not known.

Table no: 4.8
Expected Return, Standard Deviation and Coefficient of Variation of SCBNL

Fiscal Year	Closing MPS	Total Dividend	R_i	$(R_i - \bar{R}_i)$	$(R_i - \bar{R}_i)^2$
2002/03	1640	284.5	0.2416	-0.2156	0.046483
2003/04	1745	110	0.1311	-0.3261	0.106341
2004/05	2345	120	0.4126	-0.0446	0.001989
2005/06	3775	720	0.9168	0.4596	0.211232
2006/07	5900	80	0.5841	0.1269	0.016104
Total			(\bar{R}_i) =2.2862		$(R_i - \bar{R}_i)^2$ =0.3821

$$\begin{aligned} \text{Expected Return } (\bar{R}_i) &= \frac{\sum R_i}{N} \\ &= \frac{2.2862}{5} \\ &= 0.4572 \end{aligned}$$

$$\begin{aligned} \text{Standard Deviation } (\sigma_i) &= \sqrt{\frac{\sum (R_i - \bar{R}_i)^2}{N-1}} \\ &= \sqrt{\frac{0.3821}{5-1}} \\ &= 0.309 \end{aligned}$$

$$\text{Co-efficient of Variation} = \frac{\sigma_i}{\bar{R}_i}$$

$$= \frac{0.309}{0.4572}$$

$$= 0.68$$

The table shows that the bank has a positive realized rate of return from year 2002/03 to 2006/07 and the return has a fluctuating trend. Expected rate of return is 0.4572, standard deviation is 0.309 and coefficient of variation is 0.68

Table no: 4.9
Calculation of Covariance and Beta Coefficient

F/Y	(R _i - R _i)	(R _m - R _m)	(R _i - R _i) (R _m - R _m)
2002/03	-0.2156	-0.5139	0.11079684
2003/04	-0.3261	-0.3303	0.10771083
2004/05	-0.0446	-0.1261	0.00562406
2005/06	0.4596	0.9758	0.44847768
2006/07	0.1269	-0.0057	-0.0007233
Total			(R _i - R _i) (R _m - R _m) = 0.6719

$$\text{Covariance, Cov} (r_i , r_m) = \frac{(R_i - R_i)(R_m - R_m)}{N - 1}$$

$$= \frac{0.6719}{5-1}$$

$$= 0.1679$$

$$\text{Beta Coefficient} (\beta_i) = \frac{\text{Cov} (r_i , r_m)}{\sigma_m^2}$$

$$= \frac{0.1679}{0.1124}$$

$$= 1.4944$$

From the table and calculation, beta coefficient of SCBNL is 1.4944 which is greater than 1. Beta greater than 1 show that the stock of the SCBNL is more volatile than the market and stock seems to be an aggressive one.

4.1.4 Himalayan Bank Limited

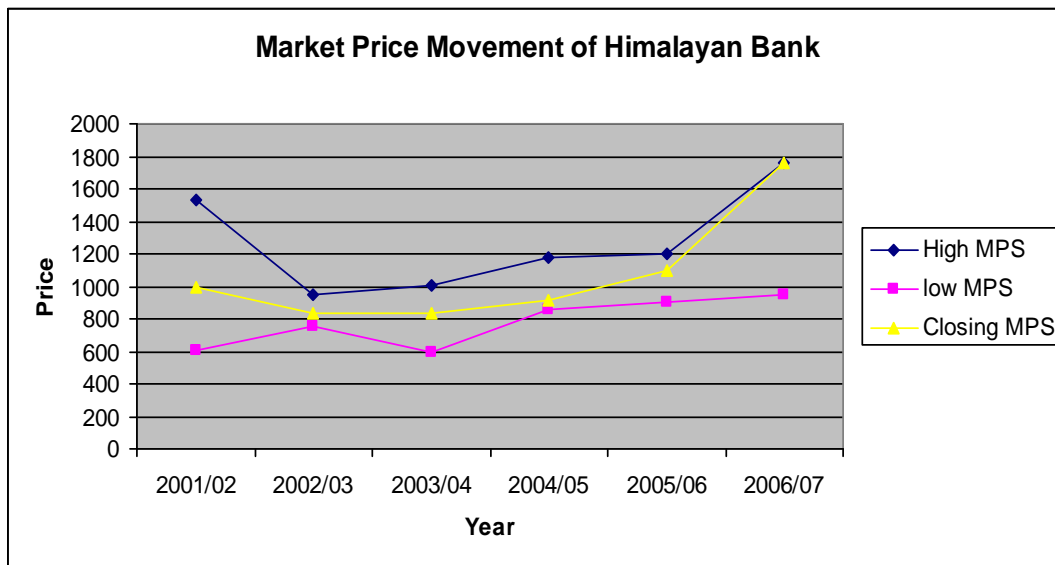
Himalayan Bank Ltd was incorporated in 1992 AD as a joint venture bank under the company act 1964 AD. Joint venture partner of HBL is Habib Bank Ltd of Pakistan.

The table below shows the Market Price of share and the dividend value of Himalayan Bank Limited.

Table no: 4.10
MPS and Dividend Data of HBL Bank

Fiscal Year	High MPS	Low MPS	Closing MPS	DPS	Stock Dividend(%)	Total Dividend (Rs.)
2001/02	1530	610	1000	25	10	93.6
2002/03	950	750	836	0	0	0
2003/04	1010	600	840	0	20	184
2004/05	1181	855	920	11.58	20	231.58
2005/06	1200	900	1100	30	5	118
2006/07	1760	950	1760	15	25	15

Figure no: 4.3



From the figure and the table, we can see that the closing MPS was in a decreasing trend from 2001/02. It was lowest in the year 2003/04. Then on, it has increased and in the year 2006/07, it was highest at Rs.1760. The bank has declared cash dividend and stock dividend in various years. The total dividend of Himalayan Bank for the year 2006/07 was equal to its cash dividend because we can not calculate stock dividend amount in the absence of the MPS of the year 2007/08.

Table no: 4.11
Expected Return, Standard Deviation and Coefficient of Variation of HBL

Fiscal Year	Closing MPS	Total Dividend	R_i	$(R_i - \bar{R}_i)$	$(R_i - \bar{R}_i)^2$
2002/03	836	0	-0.164	-0.4379	0.191756
2003/04	840	184	0.2249	-0.049	0.002401
2004/05	920	231.58	0.3709	0.097	0.009409
2005/06	1100	118	0.3239	0.05	0.0025
2006/07	1760	15	0.6136	0.3397	0.115396
Total			(\bar{R}_i) =1.3693		$(R_i - \bar{R}_i)^2$ =0.321462

$$\begin{aligned} \text{Expected Return } (\bar{R}_i) &= \frac{\sum R_i}{N} \\ &= \frac{1.3693}{5} \\ &= 0.274 \end{aligned}$$

$$\begin{aligned} \text{Standard Deviation } (\sigma_i) &= \sqrt{\frac{\sum (R_i - \bar{R}_i)^2}{N-1}} \\ &= \sqrt{\frac{0.321462}{5-1}} \\ &= 0.283 \end{aligned}$$

$$\text{Co-efficient of Variation (c.v)} = \frac{\sigma_i}{\bar{R}_i}$$

$$= \frac{0.283}{0.274}$$

$$= 1.032$$

The table shows that the bank has a negative rate of return for the year 2001/02. It is in an increasing trend except in year 2005/06 where it has decreased slightly by 0.047. Expected rate of return is 0.274, standard deviation is 0.283 and c.v is 1.032.

Table no: 12
Calculation of Covariance and Beta Coefficient

F/Y	(R _i - R _i)	(R _m - R _m)	(R _i - R _i) (R _m - R _m)
2002/03	-0.4379	-0.5139	0.225037
2003/04	-0.049	-0.3303	0.016185
2004/05	0.097	-0.1261	-0.01223
2005/06	0.05	0.9758	0.04879
2006/07	0.3397	-0.0057	-0.00194
Total			(R _i - R _i) (R _m - R _m) = 0.2758

$$\text{Covariance, Cov} (r_i , r_m) = \frac{(R_i - R_i)(R_m - R_m)}{N - 1}$$

$$= \frac{0.2758}{5 - 1}$$

$$= 0.0689$$

$$\text{Beta Coefficient} (\beta_i) = \frac{\text{Cov} (r_i , r_m)}{\sigma_m^2}$$

$$= \frac{0.0689}{0.1124}$$

$$= 0.6134$$

From above table and calculation, beta coefficient of Himalayan Bank is 0.6134 which is lower than 1. This shows that the stock of HBL is less volatile than the market. Low-beta stocks pose less risk but also lower returns.

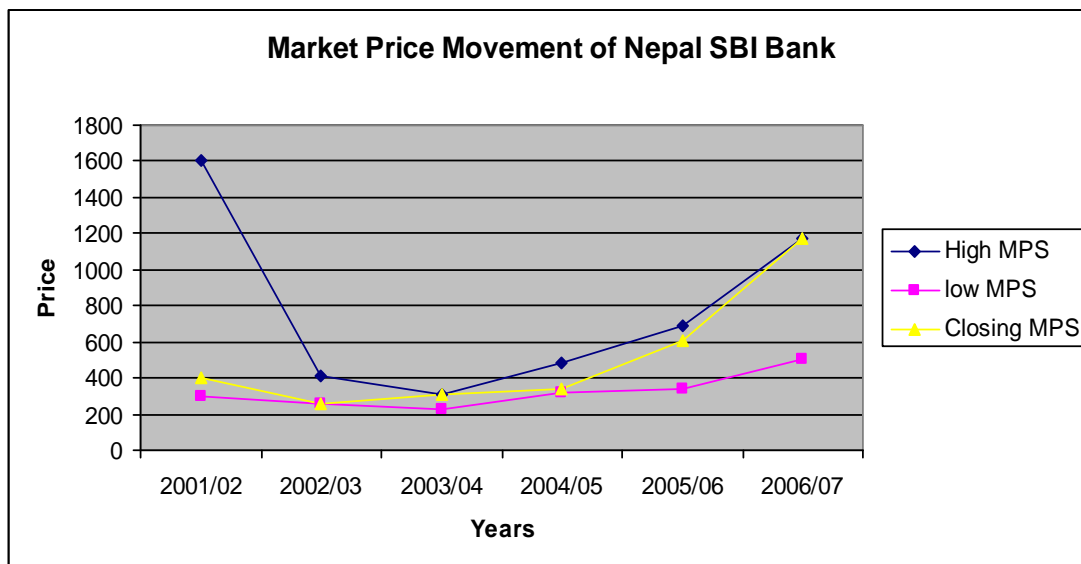
4.1.5 Nepal SBI Bank

Nepal SBI Bank Ltd. (NSBL) was established in 28 April, 1993 sponsored by three institutional promoters, namely State Bank of India, Employees Provident Fund and Agricultural Development Bank (ADB) of Nepal. Fifty percent of the bank, set up in 1993, is held by the State Bank of India, 15 percent by the Employees Provident Fund, five percent by the ADB Nepal and 30 percent by the general public

Table no.: 13
MPS and Dividend Data of Nepal SBI Bank

Fiscal Year	High MPS	Low MPS	Closing MPS	DPS	Stock Dividend(%)	Total Dividend (Rs.)
2001/02	1600	300	401	0	0	0
2002/03	410	255	255	8	0	8
2003/04	307	231	307	0	0	0
2004/05	480	315	335	0	0	0
2005/06	689	335	612	5	0	5
2006/07	1176	505	1176	12.59	35	12.59

Figure no: 4.4



From the figure and the table, we can see that the closing MPS is in an increasing trend from year 2002/03 and the highest MPS was in year 2006/07. The bank has declared cash dividend in various year and stock dividend in the year 2006/07. However, total dividend of the year 2006/07 has included only the value of cash dividend because the amount of stock dividend could not be calculated due to absence of MPS value of 2007/08.

Table no: 4.14
Expected Return, Standard Deviation and Coefficient of Variation of Nepal SBI Bank

Fiscal Year	Closing MPS	Total Dividend	R_i	$(R_i - \bar{R}_i)$	$(R_i - \bar{R}_i)^2$
2002/03	255	8	-0.3441	-0.69108	0.477592
2003/04	307	0	0.2039	-0.14308	0.020472
2004/05	335	0	0.0912	-0.25578	0.065423
2005/06	612	5	0.8418	0.49482	0.244847
2006/07	1176	12.59	0.9421	0.9421	0.887552
Total			(R_i) =1.7349		$(R_i - \bar{R}_i)^2$ =1.6959

$$\begin{aligned} \text{Expected Return } (R_i) &= \frac{\sum (R_i)}{N} \\ &= \frac{1.7349}{5} \\ &= 0.347 \end{aligned}$$

$$\begin{aligned} \text{Standard Deviation } (s_i) &= \sqrt{\frac{\sum (R_i - \bar{R}_i)^2}{N-1}} \\ s_i &= \sqrt{\frac{1.6959}{5-1}} \\ &= 0.651 \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation} &= \frac{s_i}{R_i} \\ &= \frac{0.651}{0.347} \\ &= 1.87 \end{aligned}$$

The table shows that the bank has a negative rate of return for the year 2001/02. It is in an increasing trend from year 2004/05 and has reached highest in the year 2006/07. Expected rate of return is 0.347, standard deviation is 0.651 and coefficient of variation is 1.87.

Table no: 4.15
Calculation of Covariance and Beta Coefficient

F/Y	$(R_i - R_i)$	$(R_m - R_m)$	$(R_i - R_i)(R_m - R_m)$
2002/03	-0.69108	-0.5139	0.355146
2003/04	-0.14308	-0.3303	0.047259
2004/05	-0.25578	-0.1261	0.032254
2005/06	0.49482	0.9758	0.482845
2006/07	0.9421	-0.0057	-0.00537
Total			$(R_i - R_i)(R_m - R_m) = 0.912135$

$$\begin{aligned} \text{Covariance, Cov}(r_i, r_m) &= \frac{(R_i - R_i)(R_m - R_m)}{N-1} \\ &= \frac{0.912135}{5-1} \\ &= 0.228 \end{aligned}$$

$$\begin{aligned} \text{Beta coefficient } (\beta_i) &= \frac{\text{Cov}(r_i, r_m)}{\sigma_m^2} \\ &= \frac{0.228}{0.1124} \\ &= 2.028 \end{aligned}$$

The Beta coefficient of Nepal SBI bank is 2.028 which is greater than 1. This shows that the stock of Nepal SBI bank is more volatile than the market and the stock seems to be aggressive.

4.1.6 Nepal Bangladesh Bank

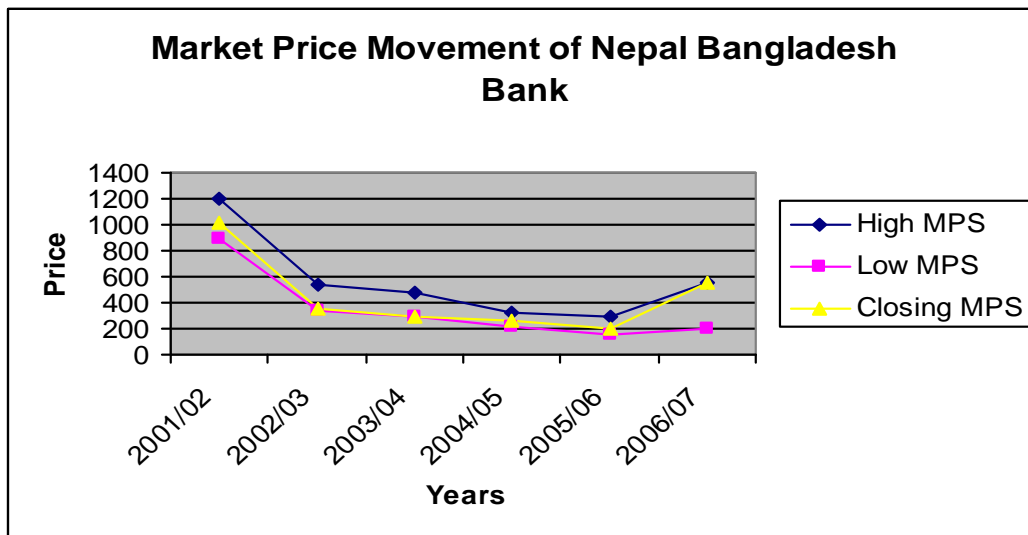
Nepal Bangladesh Bank Ltd. was established in June 1994 with an authorized capital of Rs. 240 million and Paid up capital of Rs. 60 million as a Joint Venture Bank with IFIC Bank Ltd. of Bangladesh.

The table below shows the Market Price per share and Dividend value of Nepal Bangladesh Bank

Table no: 4.16
MPS and Dividend Data of NBBL

Fiscal Year	High MPS	Low MPS	Closing MPS	DPS	Stock Dividend(%)	Total Dividend (Rs.)
2001/02	130	325	130	0	20	23
2002/03	490	349	115	20	0	20
2003/04	723	400	680	20	0	20
2004/05	905	625	870	0	20	275.8
2005/06	1410	800	1379	25	0	25
2006/07	2430	1100	2430	10	20	10

Figure no: 4.5



The Closing MPS is seen in a decreasing trend from 2001/02. The lowest MPS is in the year 2005/06. The closing MPS has increased in the year 2006/07 to Rs. 550. Cash dividend and stock dividend has not been declared in any of the year.

Table no: 4.17
Expected Return, Standard Deviation and Coefficient of Variation of NBBL

Fiscal Year	Closing MPS	Total Dividend	R_i	$(R_i - R_i)$	$(R_i - R_i)^2$
2002/03	360	0	-0.6467	-1.2337	1.522016
2003/04	290	0	-0.1944	-0.7814	0.610586
2004/05	265	0	-0.0862	-0.6732	0.453198
2005/06	199	0	-0.2491	-0.8361	0.699063
2006/07	550	0	1.7638	1.1768	1.384858
Total			$(R_i) =$ -2.3476		$(R_i - R_i)^2 =$ 4.669721

$$\begin{aligned} \text{Expected Return } (R_i) &= \frac{\sum (R_i)}{N} \\ &= \frac{-2.3476}{5} \\ &= -0.4695 \end{aligned}$$

$$\begin{aligned} \text{Standard Deviation } (s_i) &= \sqrt{\frac{\sum (R_i - R_i)^2}{N-1}} \\ s_i &= \sqrt{\frac{4.669721}{5-1}} \\ &= 1.08 \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation} &= \frac{s_i}{R_i} \\ &= \frac{1.08}{-0.4695} \\ &= 2.3 \end{aligned}$$

The table shows that the bank has a negative rate of return until fiscal year 2005/06. For the year 2006/07, it has become positive at 1.7638. Expected rate of return is -0.4695, standard deviation is 1.08 and coefficient of variation is 2.3

Table no: 18
Calculation of Covariance and Beta Coefficient

F/Y	$(R_i - R_i)$	$(R_m - R_m)$	$(R_i - R_i) (R_m - R_m)$
2002/03	-1.2337	-0.5139	0.633998
2003/04	-0.7814	-0.3303	0.258096
2004/05	-0.6732	-0.1261	0.084891
2005/06	-0.8361	0.9758	-0.81587
2006/07	1.1768	-0.0057	-0.00671
Total			$(R_i - R_i) (R_m - R_m) = 0.1544$

$$\begin{aligned} \text{Covariance, } \text{Cov}(r_i, r_m) &= \frac{(R_i - R_i)(R_m - R_m)}{N-1} \\ &= \frac{0.1544}{5-1} \\ &= 0.0386 \end{aligned}$$

$$\begin{aligned} \text{Beta Coefficient } (\beta_i) &= \frac{\text{Cov}(r_i, r_m)}{\sigma_m^2} \\ &= \frac{0.0386}{0.1124} \\ &= 0.3434 \end{aligned}$$

From the above table and calculation, beta coefficient of Nepal Bangladesh bank is 0.3434. The beta coefficient of the less than 1 show that the stock is less volatile than the market. Low-beta stocks pose less risk but also lower returns.

4.1.6 Everest Bank Ltd

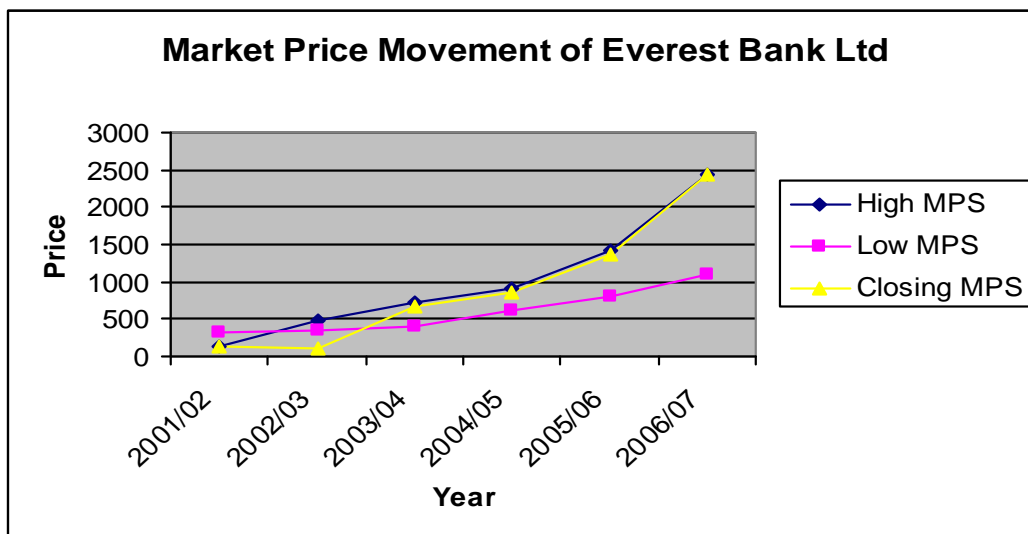
Everest bank was established in 1994 AD with a view and objectives of extending professionalized and efficient banking services to various segments of the society.. Its joint venture partner is Punjab National Bank (PNB) which is holding 20% equity in the bank.

The table below shows the Market Price of share and dividend value of Everest Bank.

Table no.: 4.19
MPS and Dividend Data of EBL

Fiscal Year	High MPS	Low MPS	Closing MPS	DPS	Stock Dividend(%)	Total Dividend (Rs.)
2001/02	130	325	130	0	20	23
2002/03	490	349	115	20	0	20
2003/04	723	400	680	20	0	20
2004/05	905	625	870	0	20	275.8
2005/06	1410	800	1379	25	0	25
2006/07	2430	1100	2430	10	20	10

Figure no: 4.6



From the above figure and table, we can see that the closing MPS is in increasing trend from fiscal year 2002/03. the highest MPS is in year 2006/07 which is Rs 2430. Cash dividend is declared in the year 2002/03, 2003/04, 2005/06 and 2006/07 whereas stock dividend is declared in the year 2004/05 and 2006/07.

Table no: 4.20
Expected Return, Standard Deviation and Coefficient of Variation of EBL

Fiscal Year	Closing MPS	Total Dividend	R_i	$(R_i - \bar{R}_i)$	$(R_i - \bar{R}_i)^2$
2002/03	115	20	0.0385	-1.4002	1.96056
2003/04	680	20	5.087	3.6483	13.31009
2004/05	870	275.8	0.685	-0.7537	0.568064
2005/06	1379	25	0.6138	-0.8249	0.68046
2006/07	2430	10	0.7694	-0.6693	0.447962
Total			$(\bar{R}_i) = 7.1937$		$(R_i - \bar{R}_i)^2 = 16.9671$

$$\begin{aligned} \text{Expected Return } (\bar{R}_i) &= \frac{\sum R_i}{N} \\ &= \frac{7.1937}{5} \\ &= 1.4387 \end{aligned}$$

$$\begin{aligned} \text{Standard Deviation } (\sigma_i) &= \sqrt{\frac{\sum (R_i - \bar{R}_i)^2}{N-1}} \\ &= \sqrt{\frac{16.9671}{5-1}} \\ &= 2.06 \end{aligned}$$

$$\begin{aligned} \text{Co-efficient of Variation} &= \frac{\sigma_i}{\bar{R}_i} \\ &= \frac{2.06}{1.4387} \\ &= 1.431 \end{aligned}$$

The table shows that the bank has positive rate of return from fiscal year 2002/03 to 2006/07. Expected rate of return is 1.4387, standard deviation is 2.06 and coefficient of variation is 1.431.

Table no: 4.21
Calculation of Covariance and Beta Coefficient

F/Y	$(R_i - R_i)$	$(R_m - R_m)$	$(R_i - R_i) (R_m - R_m)$
2002/03	-1.4002	-0.5139	0.719563
2003/04	3.6483	-0.3303	-1.20503
2004/05	-0.7537	-0.1261	0.095042
2005/06	-0.8249	0.9758	-0.80494
2006/07	-0.6693	-0.0057	0.003815
Total			$(R_i - R_i) (R_m - R_m) = -1.19155$

$$\begin{aligned} \text{Covariance, } \text{Cov}(r_i, r_m) &= \frac{(R_i - R_i)(R_m - R_m)}{N-1} \\ &= \frac{-1.19155}{5-1} \\ &= -0.298 \end{aligned}$$

$$\begin{aligned} \text{Beta Coefficient } (\beta_i) &= \frac{\text{Cov}(r_i, r_m)}{\sigma_m^2} \\ &= \frac{-0.298}{0.1124} \\ &= -2.65 \end{aligned}$$

From the above table and calculation, we can conclude that the beta coefficient of the stock of Everest Bank is less than 1. This shows that the stock is less volatile than the market.

4.2 Analysis of Various Common Stocks

4.2.1 Expected return, Standard Deviation and Coefficient of Variation

According to the result from table no 4.1 to 4.21, a comparative analysis of expected return, standard deviation and coefficient of variation are performed in table no .

Table no: 4.22
Comparative Analysis of Expected Return, Standard Deviation and Coefficient Variation

Banks	Expected Return	Standard Deviation	Coefficient Variation
NABIL	0.5872	0.4464	0.76
SCBNL	0.4572	0.309	0.68
HBL	0.274	0.283	1.032
Nepal SBI Ltd	0.347	0.651	1.87
NBBL	-0.4695	1.08	2.3
EBL	1.4387	2.06	1.431

From the table we can see that the investor would get the highest return by investing in the stock of NABIL bank. It has an expected return of 0.5872. However for this return, the investor should also bear a higher risk which is 0.4464, which is the second highest risk among the six joint venture banks. However, the Coefficient of Variation, which measure the per unit risk, is highest for Nepal Bangladesh Bank. It means that investing in stock of Nepal Bangladesh Bank is more risky than investing in other stocks. The lowest Coefficient of Variation is for Standard Chartered Bank which is 0.68.

4.2.2 Inter Bank Beta Coefficient

A systematic risk of an individual stock can be evaluated by the help of a beta coefficient. Beta of a stock can be equal, less than or higher than 1. If beta is 1, it shows average market risk and commands average market risk premium. If beta is less than 1, it implies that stock is less volatile than market and it is said to be a defensive stock. If beta is more than 1, it implies stock is more volatile than that of market and it is said to be an aggressive stock. If the beta is positive, it moves with the market. That means stock return will rise when market return rises and vice versa.

Table no: 4.24
Beta coefficient of each bank

Banks	Beta
Nepal Arab Bank Ltd	0.5976
Standard Chartered Bank Nepal Ltd	1.4944
Himalayan Bank Ltd	0.6134
Nepal SBI Ltd	2.028
Nepal Bangladesh Bank Ltd	0.3434
Everest Bank Ltd	-2.65

As depicted in the table, Nepal SBI Bank has the highest beta value at 2.028. After that, Standard Chartered Bank has the highest beta at 1.4944. The lowest beta value is that of Everest Bank Ltd at -2.65. A positive value of Beta shows that the stock value moves with the market. For eg, for Nepal SBI Bank, if the market return rises by 1%, the value of Nepal SBI stock rises by 2.028% and vice versa. It also shows that the stock is 2.028 times risky than an average stock having beta 1.

4.2.3 Capital Asset Pricing Model

The capital asset pricing model identifies security return net of risk free rate as proportional to the expected net market return, where beta serves as the constant of proportionality. As a consequences of this relationship, all securities in equilibrium, plot along a straight line called the security market line (SML). Since the unsystematic risk tends to be diversified away by the construction of an efficient portfolio, it is desirable an alternative to CML, which will use beta as the independent variable and will accommodate both portfolios and individual assets. Such a line is called Security Market Line (SML).” (Bhalla, 2001:561)

There is a linear relationship between their expected return and their covariance with the market portfolio. This relationship, called the Security Market Line (SML). This relationship can be expressed in the form of an equation as follows

$$R_j = R_f + (R_m - R_f) b_j$$

Where,

R_j = the required rate of return for stock j

R_f = risk free rate of return

R_m = the required rate of return on the market portfolio

b_j = the beta coefficient for asset j

The required rate of return and the stock price situation of each joint venture bank are mentioned in the table below:

Table no: 4.25

Required Rate of Return and Stock Price Situation of each Bank

Banks	Beta (b_j)	$R_j=R_f +(R_m- R_f) b_j$	Expected Return	Remark
NABIL	0.5976	0.3722	0.5872	Underpriced
SCBNL	1.4944	0.6571	0.45724	Overpriced
HBL	0.6134	0.2745	0.2739	Overpriced
Nepal SBI	2.028	0.7856	0.347	Overpriced
NBBL	0.3434	0.177	-0.4695	Underpriced
EBL	-2.65	0.2745	1.4387	Underpriced

Where R_f =risk free rate of return= 0.052917

Average of 5 years weighted average return of T-bill, 364 days

(source: NRB, economic bulletin, may-july 2007)

Return on Market (R_m) = 0.4142

The above table shows that the stock of NABIL Bank, Nepal Bangladesh Bank and Everest Bank has underpriced stocks whereas the stock of Standard Chartered Bank, Himalayan Bank and Nepal SBI bank has overpriced stocks. For an investor point of view, the underpriced shares should be purchased so that when its price rises, the investor can sell the shares and earn profit. Therefore, from CAPM model, the investor should invest on stocks of NABIL bank, Nepal Bangladesh Bank and Everest Bank.

4.3 Combined Pooled Selected Commercial Banks

The return of the common stock of combined/pooled commercial banks is given in the following table

Table no: 4.26
Average Return of Pooled Commercial Banks

Fiscal year	NABI L	SCBNL	HBL	Nepal SBI	NBBL	EVREST	Sum	Average
2002/03	0.068	0.2416	-0.164	-0.3441	-0.6467	0.0385	-0.8067	-0.1344
2003/04	0.449	0.1311	0.2249	0.2039	-0.1944	5.087	5.9015	0.9835
2004/05	0.575	0.4126	0.3709	0.0912	-0.0862	0.685	2.0485	0.3414
2005/06	0.5449	0.9168	0.3239	0.8418	-0.2491	0.6138	2.9921	0.4986
2006/07	1.299	0.5841	0.6136	0.9421	1.7638	0.7694	5.972	0.9953

The calculation of Expected Return, Standard Deviation of pooled commercial bank are as follows

Table no: 4.27
Expected Return and Standard Deviation of Pooled Commercial Bank

Fiscal Year	Sum (R_B)	$(R_B - R_B)$	$(R_B - R_B)^2$
2002/03	-0.13445	-0.67136	0.450729
2003/04	0.983583	0.44667	0.199514
2004/05	0.341417	-0.1955	0.038219
2005/06	0.498683	-0.03823	0.001462
2006/07	0.995333	0.45842	0.210149
Total	$R_B = 2.6845$		$(R_B - R_B)^2 = 0.90$

$$\begin{aligned} \text{Expected Return (R}_B) &= \frac{\sum(R_B)}{N} \\ &= \frac{2.6845}{5} \\ &= 0.5369 \end{aligned}$$

$$\begin{aligned} \text{Standard Deviation (} \sigma_B) &= \frac{\sqrt{\sum(R_B - R_B)^2}}{N-1} \\ \sigma_B &= \frac{0.90}{5-1} \\ &= 0.4743 \end{aligned}$$

1. For two assets portfolio, here the portfolio of common stock of NABIL Bank (lets suppose stock A) and common stock of combined/ pooled selected six commercial banks (lets suppose stock B) is analyzed. The following table shows the financial and statistical analysis of the newly formed two asset portfolio.

Table no: 4.28
Analysis of Two-Assets Portfolio

Covariance	0.1543
Correlation	0.7288
Weight of stock A	0.61
Weight of stock B	0.39
Portfolio return	0.5676
Portfolio risk	0.4262

(See detail calculation on ANNEXE I)

Here, in case of portfolio of NABIL Bank and pooled four commercial bank's common stock, the correlation is positive correlation. That's why the portfolio construction between these two stocks is not so beneficial.

The proportion of stock A and stock B which minimizes the risk in portfolio is 61% in stock A and 39% in stock B.

Using diversification we can reduce the risk. Standard deviation of NABIL was 0.4464. However, after portfolio construction, the risk came down to 0.4262 which is lower than the risk before diversification. The return from the portfolio constructed is 0.5676.

2. For two assets portfolio, here the portfolio of common stock of Standard Chartered Bank (lets suppose stock A) and common stock of combined/ pooled selected six commercial banks (lets suppose stock B) is analyzed. The following table shows the financial and statistical analysis of the newly formed two asset portfolio.

Table no: 4.29
Analysis of Two-Assets Portfolio

Covariance	0.0121
Correlation	0.083
Weight of stock A	0.72
Weight of stock B	0.28
Portfolio return	0.48
Portfolio risk	0.268

(see detail calculation on ANNEXE II)

Here, in case of portfolio of SCBNL Bank and pooled four commercial bank's common stock, the correlation is 0.083 which is positive correlation. That's why the portfolio construction between these two stocks is not so beneficial.

The proportion of stock A and stock B which minimizes the risk in portfolio is 72% in stock A and 28% in stock B.

Using diversification we can reduce the risk. Standard deviation of Standard Chartered Bank was 0.309. However, after portfolio construction, the risk came down to 0.268 which is lower than the risk before diversification. The return from the newly formed portfolio is 0.48.

3. For two assets portfolio, here the portfolio of common stock of Himalayan Bank (lets suppose stock A) and common stock of combined/ pooled selected six commercial banks (lets suppose stock B) is analyzed. The following table shows the financial and statistical analysis of the newly formed two asset portfolio.

Table no: 4.30
Analysis of Two-Assets Portfolio

Covariance	0.018
Correlation	0.134
Weight of stock A	1.2
Weight of stock B	-0.2
Portfolio return	0.2214
Portfolio risk	0.274

(see detail calculation on ANNEXE III)

Here, in case of portfolio of Himalayan Bank and pooled four commercial bank's common stock, the correlation is positive correlation. That's why the portfolio construction between these two stocks is not so beneficial.

The proportion of stock A and stock B which minimizes the risk in portfolio is 61% in stock A and 39% in stock B.

Using diversification we can reduce the risk. Standard deviation of Himalayan Bank was 0.4464. However, after portfolio construction, the risk came down to 0.274 which is lower than the risk before diversification. The return from the newly formed portfolio is 0.2214.

4. For two assets portfolio, here the portfolio of common stock of Nepal SBI Bank (lets suppose stock A) and common stock of combined/ pooled selected six commercial banks (lets suppose stock B) is analyzed. The following table shows the financial and statistical analysis of the newly formed two asset portfolio.

Table no: 4.31
Analysis of Two-Assets Portfolio

Covariance	0.2158
Correlation	0.699
Weight of stock A	0.04
Weight of stock B	0.96
Portfolio return	0.5293
Portfolio risk	0.47

(see detail calculation on ANNEXE IV)

Here, in case of portfolio of Nepal SBI Bank and pooled four commercial bank's common stock, the correlation is positive correlation. That's why the portfolio construction between these two stocks is not so beneficial.

The proportion of stock A and stock B which minimizes the risk in portfolio is 61% in stock A and 39% in stock B.

Standard deviation of Nepal SBI Bank was 0.4464. However, after portfolio construction, the risk came down to 0.47 which is higher than the risk before diversification. Hence, this portfolio is not suitable for construction.

5. For two assets portfolio, here the portfolio of common stock of Nepal Bangladesh Bank (lets suppose stock A) and common stock of combined/ pooled selected six commercial banks (lets suppose stock B) is analyzed. The following table shows the financial and statistical analysis of the newly formed two asset portfolio.

Table no: 4.32
Analysis of Two-Assets Portfolio

Covariance	0.2956
Correlation	0.577
Weight of stock A	- 0.08
Weight of stock B	1.08
Portfolio return	0.6174
Portfolio risk	0.534

(see detail calculation on ANNEXE V)

Here, in case of portfolio of Nepal Bangladesh Bank and pooled four commercial bank's common stock, the correlation is positive correlation. That's why the portfolio construction between these two stocks is not so beneficial.

The proportion of stock A and stock B which minimizes the risk in portfolio is -8% in stock A and 108% in stock B.

Diversification reduces risks. Standard deviation of Nepal Bangladesh Bank was 1.08. However, after portfolio construction, the risk became 0.534 which is lower than the risk before diversification. The portfolio return is 0.254.

6. For two assets portfolio, here the portfolio of common stock of Everest Bank (lets suppose stock A) and common stock of combined/ pooled selected six commercial banks (lets suppose stock B) is analyzed. The following table shows the financial and statistical analysis of the newly formed two asset portfolio.

Table no: 4.33
Analysis of Two-Assets Portfolio

Covariance	0.6104
Correlation	0.6247
Weight of stock A	0.11
Weight of stock B	0.89
Portfolio return	0.63
Portfolio risk	0.59

(see detail calculation on ANNEXE VI)

Here, in case of portfolio of Everest Bank and pooled four commercial bank's common stock, the correlation is positive correlation. That's why the portfolio construction between these two stocks is not so beneficial.

The proportion of stock A and stock B which minimizes the risk in portfolio is 61% in stock A and 39% in stock B.

Standard deviation of Everest Bank was 2.06. However, after portfolio construction, the risk came down to 0.59 which is lower than the risk before diversification. The portfolio return is 0.63.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter summarizes the whole study. It draws the conclusion from the study and forwards recommendation to erase the weakness of concerned banks observed on the basis of findings.

5.1 Summary

Stock markets is the backbone of investment sector of the country. There is only one stock market in Nepal i.e Nepal Stock Exchange (NEPSE). All securities (besides government securities) are traded in such stock market. To make share transaction, the company should be first listed in the NEPSE. Among all the sectors listed in NEPSE, banking sector plays vital role in the stock market in terms of market capitalization, volume of share traded and amount of share traded.

Common stock is the most risky security and life-blood of stock market and investment in common stock is very sensitive on the ground of risk. Investment is distinguished from speculation by the time horizon of the investor and often by the risk return characteristic of the investment. The true investor is interested in a good rate of return for a relatively long period of time.

Portfolio is a collection of securities. It simply represents the practice among the investors having their fund in more than one asset. Portfolio management is concerned with efficient management of portfolio investment in financial assets, including shares

and debenture of companies. Portfolio analysis considers the determination of future risk and return in holding various blends of individual securities.

The main objective of the study is to find out level of portfolio risk and return on common stock of commercial banks investment. The study is focused on portfolio analysis on common stock of listed six joint venture banks. the data used in this study are mainly secondary in nature. For analysis financial tools like portfolio risk, portfolio return and portfolio performance as well as statistical tools like mean, standard deviation, coefficient of variation, covariance, correlation are used. The data and results are tabulated and presented in figures as the requirement of the study. This study has been summarized with the help of risk diversification an investor can get better result on his investment in stocks of different banks rather than on one stock.

5.2 Conclusions

-) The closing price of NABIL, SCBNL, HBL, Nepal SBI Bank and EBL all seem to be in an increasing trend for the past four years. There has been some fluctuation in the closing price of NBBL. However, it is also showing signs of recovery.
-) Everest bank gives the highest return to investor. For this risk, the investor should also bear the highest risk. The stock of Standard Chartered Bank is safest as it has the lowest per unit risk.
-) The beta itself measures the sensitivity of the stock's return with respect to the change in market return. Nepal SBI Bank has the highest beta of 2.028 which

- means that the stock of Nepal SBI Bank is twice more risky than the average stock having beta 1. The Everest Bank shows negative beta of -2.65.
-) For an investor, underpriced shares should be purchased so that long position would be beneficiary. For this reason, investment in shares of NABIL bank, NBBL and EBL would be beneficial.
 -) Investment in portfolio helps to reduce the risk of an investor. Portfolio should be constructed in such a way that it gives highest return to investor with least risk. The study shows that the highest return is obtained by constructing a portfolio where there is 11% investment in stock of Everest Bank and remaining 89% investment in stock of pooled joined venture banks. It gives a return of 0.63. however, it also includes highest risk of 0.59.

5.3 Recommendations

-) Proper way of construction of portfolio will reduce considerable potential loss, which is defined in terms of risk. But portfolio is a dynamic hob. For optimum portfolio select a stock having negatively correlation. Stock with positive correlation cannot diversify risk properly.
-) NEPSE needs to modernize the trading system and effective information channel. It needs to develop different program for private investor such as meeting and seminar in different subject matter
-) Lack of information with regard to trading procedure of NEPSE also one of the cause of lower trading volume

-) To enhance growth and development of capital market of the country more research on common stock investment should be done with maximum number of sample
-) While making investment in stock, market assessment or personal risk attitude, needs and requirement will be added advantage. Reliable information rather than rumor and imagination will ultimately favor the investor.
-) Investor should purchase those stocks whose required rate of return are less than expected rate of return. Thus from investor point of view, under priced stock should be purchased and long position strategy would be beneficiary.
-) Investment on common stock is a risky job. It does not guarantee both return and principal. So, investor should be acquainted with the associated risk and workout their attitude towards the riskiness of various investment strategies.

APPENDIX I

Covariance, Correlation and Weights of Stock A and NABIL

Fiscal year	$(R_A - R_A)$	$(R_B - R_B)$	$(R_A - R_A)(R_B - R_B)$
2002/03	-0.5192	-0.67136	0.34857
2003/04	-0.1382	0.44667	-0.0617
2004/05	-0.0122	-0.1955	0.0023
2005/06	-0.0423	-0.03823	0.0016
2006/07	0.7118	0.45842	0.3263
			$(R_A - R_A)(R_B - R_B) = 0.6171$

$$\begin{aligned}
 \text{Covariance, Cov}(r_i, r_m) &= \frac{(R_A - R_A)(R_B - R_B)}{N - 1} \\
 &= \frac{0.6171}{5 - 1} \\
 &= 0.1543
 \end{aligned}$$

The proportion of stock A which minimizes the risk in portfolio

$$\begin{aligned}
 W_A &= \frac{B^2 - \text{Cov}(R_A, R_B)}{A^2 + B^2 - 2 \text{Cov}(R_A, R_B)} \\
 &= \frac{(0.4743)^2 - 0.1543}{(0.4464)^2 + (0.4743)^2 - 2(0.1543)} \\
 &= 0.61
 \end{aligned}$$

$$\text{Proportion of stock B } (W_B) = 1 - W_A = 1 - 0.61 = 0.39$$

$$\begin{aligned}
 \text{Correlation } (r_{AB}) &= \frac{\text{Cov}(R_A, R_B)}{A} \\
 &= \frac{0.1543}{(0.4464)(0.4743)} \\
 &= 0.7288
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio return } (R_p) &= W_A R_A + W_B R_B \\
 &= (0.61)(0.5872) + (0.39)(0.5369) \\
 &= 0.5676
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio risk } (r_p) &= \sqrt{W_A^2 A^2 + W_B^2 B^2 + 2W_A W_B \text{Cov}(R_A, R_B)} \\
 &= \sqrt{(0.61)^2 (0.4464)^2 + (0.39)^2 (0.4743)^2 + 2(0.61)(0.39)(0.1543)} \\
 &= 0.4262
 \end{aligned}$$

APPENDIX II

Covariance, correlation and weights of stock A and Standard Chartered Bank

Fiscal year	$(R_A - R_A)$	$(R_B - R_B)$	$(R_A - R_A)(R_B - R_B)$
2002/03	-0.2156	-0.67136	0.1447
2003/04	-0.3261	0.44667	-0.1456
2004/05	-0.0446	-0.1955	0.0087
2005/06	0.4596	-0.03823	-0.0175
2006/07	0.1269	0.45842	0.0581
			$(R_A - R_A)(R_B - R_B) = 0.0484$

$$\begin{aligned}
 \text{Covariance, } \text{Cov}(r_A, r_B) &= \frac{(R_A - R_A)(R_B - R_B)}{N - 1} \\
 &= \frac{0.0484}{5 - 1} \\
 &= 0.0121
 \end{aligned}$$

The proportion of stock A which minimizes the risk in portfolio

$$\begin{aligned}
 W_A &= \frac{\sigma_B^2 - \text{Cov}(R_A, R_B)}{\sigma_A^2 + \sigma_B^2 - 2 \text{Cov}(R_A, R_B)} \\
 &= \frac{(0.4743)^2 - 0.0121}{(0.309)^2 + (0.4743)^2 - 2(0.0121)} \\
 &= 0.72
 \end{aligned}$$

$$\text{Proportion of Stock B } (W_B) = 1 - W_A = 1 - 0.72 = 0.28$$

$$\begin{aligned}
 \text{Correlation } (r_{AB}) &= \frac{\text{Cov}(R_A, R_B)}{\sigma_A \cdot \sigma_B} \\
 &= \frac{0.0121}{(0.309)(0.4743)} \\
 &= 0.083
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio return } (R_p) &= W_A R_A + W_B R_B \\
 &= (0.72)(.4572) + (0.28)(0.5369) \\
 &= 0.48
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio risk } (\sigma_p) &= \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2W_A W_B \text{Cov}(R_A, R_B)} \\
 &= \sqrt{(0.72)^2 (0.309)^2 + (0.28)^2 (0.4743)^2 + 2(0.72)(0.28)(0.0121)} \\
 &= 0.268
 \end{aligned}$$

APPENDIX III

Covariance, correlation and weights of stock A and HBL

Fiscal year	$(R_A - R_A)$	$(R_B - R_B)$	$(R_A - R_A) (R_B - R_B)$
2002/03	-0.4379	-0.67136	0.2939
2003/04	-0.049	0.44667	-0.0218
2004/05	0.097	-0.1955	-0.0189
2005/06	0.05	-0.03823	-0.0019
2006/07	0.3397	0.45842	0.1557
			$(R_A - R_A) (R_B - R_B) = 0.407$

$$\begin{aligned}
 \text{Covariance, Cov } (r_i, r_m) &= \frac{(R_A - R_A)(R_B - R_B)}{N - 1} \\
 &= \frac{0.407}{5 - 1} \\
 &= 0.1018
 \end{aligned}$$

The proportion of stock A which minimizes the risk in portfolio

$$\begin{aligned}
 W_A &= \frac{B^2 - \text{Cov}(R_A, R_B)}{A^2 + B^2 - 2 \text{Cov}(R_A, R_B)} \\
 &= \frac{(0.4743)^2 - 0.1018}{(0.283)^2 + (0.4743)^2 - 2(0.1018)} \\
 &= 1.2
 \end{aligned}$$

$$\text{Weight of Stock B } (W_B) = 1 - W_A = 1 - 1.2 = -0.2$$

$$\begin{aligned}
 \text{Correlation } (r_{AB}) &= \frac{\text{Cov}(R_A, R_B)}{A \cdot B} \\
 &= \frac{0.1018}{(0.283)(0.4743)} \\
 &= 0.134
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio return } (R_P) &= W_A R_A + W_B R_B \\
 &= (1.2)(0.274) + (-0.2)(0.5369) \\
 &= 0.2214
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio risk } (r_p) &= \frac{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2W_A W_B \text{Cov}(R_A, R_B)}{1} \\
 &= (1.2)^2 (0.283)^2 + (-0.2)^2 (0.4743)^2 + 2(1.2)(-0.2)(0.1018) \\
 &= .1153 + .009 - .0489 \\
 &= 0.274
 \end{aligned}$$

APPENDIX IV

Covariance, correlation and weights of stock A and Nepal SBI

Fiscal year	$(R_A - R_A)$	$(R_B - R_B)$	$(R_A - R_A) (R_B - R_B)$
2002/03	-0.69108	-0.67136	0.4639
2003/04	-0.14308	0.44667	-0.0634
2004/05	-0.25578	-0.1955	0.05
2005/06	0.49482	-0.03823	-0.0189
2006/07	0.9421	0.45842	0.4318
			$(R_A - R_A) (R_B - R_B) = 0.8630$

$$\begin{aligned}
 \text{Covariance, } \text{Cov} (r_i , r_m) &= \frac{(R_A - R_A) (R_B - R_B)}{N - 1} \\
 &= \frac{0.8630}{5 - 1} \\
 &= 0.2158
 \end{aligned}$$

The proportion of stock A which minimizes the risk in portfolio

$$\begin{aligned}
 W_A &= \frac{B^2 - \text{Cov} (R_A, R_B)}{A^2 + B^2 - 2 \text{Cov} (R_A, R_B)} \\
 &= \frac{(0.4743)^2 - 0.2158}{(0.651)^2 + (0.4743)^2 - 2 (0.2158)} \\
 &= 0.04
 \end{aligned}$$

$$\text{Proportion of Stock B } (W_B) = 1 - W_A = 1 - 0.04 = 0.96$$

$$\begin{aligned}
 \text{Correlation } (r_{AB}) &= \frac{\text{Cov} (R_A, R_B)}{A \cdot B} \\
 &= \frac{0.2158}{(0.651) (0.4743)} \\
 &= 0.699
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio return } (R_P) &= W_A R_A + W_B R_B \\
 &= (0.04) (0.347) + (0.96) (0.5369) \\
 &= 0.5293
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio risk } (\sigma_p) &= \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2W_A W_B \text{Cov} (R_A, R_B)} \\
 &= \sqrt{(0.04)^2 (0.651)^2 + (0.96)^2 (0.4743)^2 + 2 (0.04) (0.96) (0.2158)} \\
 &= 0.0007 + 0.2073 + 0.0165 \\
 &= 0.47
 \end{aligned}$$

ANNEXE V

Covariance, correlation and weights of stock A and NBBL

Fiscal year	$(R_A - R_A)$	$(R_B - R_B)$	$(R_A - R_A)(R_B - R_B)$
2002/03	-1.2337	-0.67136	0.8282
2003/04	-0.7814	0.44667	-0.3490
2004/05	-0.6732	-0.1955	0.1316
2005/06	-0.8361	-0.03823	0.0319
2006/07	1.1768	0.45842	0.5394
			$(R_A - R_A)(R_B - R_B) = 1.1822$

$$\begin{aligned}
 \text{Covariance, } \text{Cov}(r_i, r_m) &= \frac{(R_A - R_A)(R_B - R_B)}{N-1} \\
 &= \frac{1.1822}{5-1} \\
 &= 0.2956
 \end{aligned}$$

The proportion of stock A which minimizes the risk in portfolio

$$\begin{aligned}
 W_A &= \frac{B^2 - \text{Cov}(R_A, R_B)}{A^2 + B^2 - 2 \text{Cov}(R_A, R_B)} \\
 &= \frac{(0.4743)^2 - 0.2956}{(1.08)^2 + (0.4743)^2 - 2(0.2956)} \\
 &= -0.08
 \end{aligned}$$

$$\text{Weight of stock B } (W_B) = 1 - W_A = 1 - (-0.08) = 1.08$$

$$\begin{aligned}
 \text{Correlation } (r_{AB}) &= \frac{\text{Cov}(R_A, R_B)}{A \cdot B} \\
 &= \frac{0.2956}{(1.08)(0.4743)} \\
 &= 0.577
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio return } (R_p) &= W_A R_A + W_B R_B \\
 &= (-0.08)(-0.4695) + (1.08)(0.5369) \\
 &= 0.6174
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio risk } (r_p) &= \sqrt{W_A^2 A^2 + W_B^2 B^2 + 2W_A W_B \text{Cov}(R_A, R_B)} \\
 &= \sqrt{(-0.08)^2 (1.08)^2 + (1.08)^2 (0.4743)^2 + 2(-0.08)(1.08)(0.2956)} \\
 &= 0.534
 \end{aligned}$$

ANNEXE VI

Covariance, correlation and weights of stock A and Everest

Fiscal year	$(R_A - R_A)$	$(R_B - R_B)$	$(R_A - R_A)(R_B - R_B)$
2002/03	-1.4002	-0.67136	0.9400
2003/04	3.6483	0.44667	1.6295
2004/05	-0.7537	-0.1955	0.1473
2005/06	-0.8249	-0.03823	0.0315
2006/07	-0.6693	0.45842	-0.3068
			$(R_A - R_A)(R_B - R_B) = 2.4416$

$$\begin{aligned}
 \text{Covariance, Cov}(r_i, r_m) &= \frac{(R_A - R_A)(R_B - R_B)}{N - 1} \\
 &= \frac{2.4416}{5 - 1} \\
 &= 0.6104
 \end{aligned}$$

The proportion of stock A which minimizes the risk in portfolio

$$\begin{aligned}
 W_A &= \frac{\sigma_B^2 - \text{Cov}(R_A, R_B)}{\sigma_A^2 + \sigma_B^2 - 2 \text{Cov}(R_A, R_B)} \\
 &= \frac{(0.4743)^2 - 0.6104}{(2.06)^2 + (0.4743)^2 - 2(0.6104)} \\
 &= 0.11
 \end{aligned}$$

Proportion of stock B (W_B) = $1 - W_A = 1 - 0.11 = 0.89$

$$\begin{aligned}
 \text{Correlation}(r_{AB}) &= \frac{\text{Cov}(R_A, R_B)}{\sigma_A \cdot \sigma_B} \\
 &= \frac{0.6104}{(2.06)(0.4743)} \\
 &= 0.6247
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio return}(R_p) &= W_A R_A + W_B R_B \\
 &= (0.11)(1.4387) + (0.89)(0.5369) \\
 &= 0.63
 \end{aligned}$$

$$\begin{aligned}
 \text{Portfolio risk}(\sigma_p) &= \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2W_A W_B \text{Cov}(R_A, R_B)} \\
 &= \sqrt{(0.11)^2 (2.06)^2 + (0.89)^2 (0.4743)^2 + 2(0.11)(0.89)(0.6104)} \\
 &= 0.0513 + 0.1781 + .119 \\
 &= 0.59
 \end{aligned}$$

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